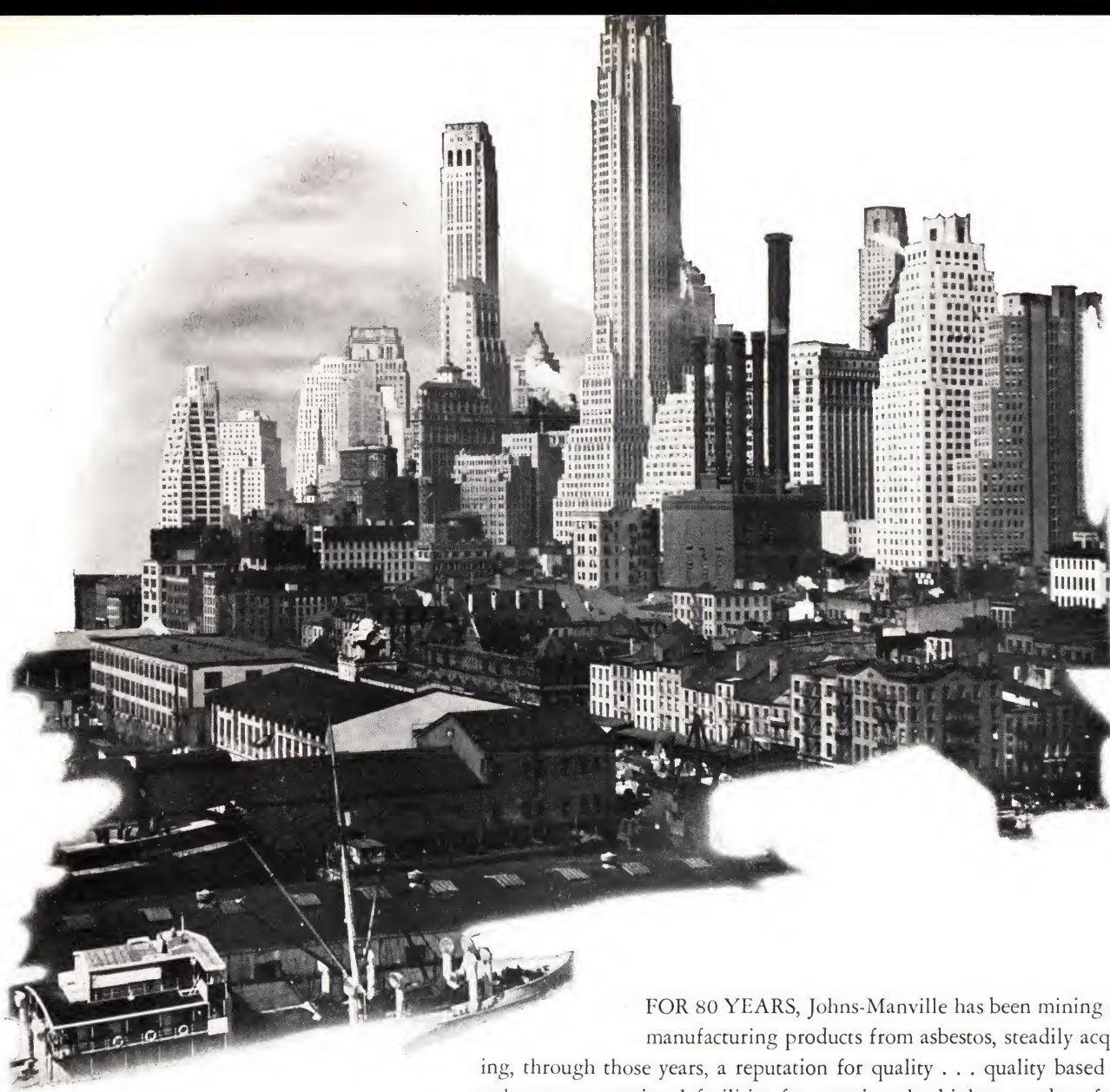


Johns-Manville



**BONDED
BUILT-UP
ROOFS**





FOR 80 YEARS, Johns-Manville has been mining and manufacturing products from asbestos, steadily acquiring, through those years, a reputation for quality . . . quality based not only upon exceptional facilities for securing the highest grades of raw material . . . as one would expect from the largest asbestos mine in the world . . . but also the quality which results from years of research and experience in fabricating asbestos in its eleven huge factories throughout the United States.

For sixty of those 80 years, Johns-Manville has combined the facilities of a great mine with the expert knowledge and skill of a large manufacturer in the making of asbestos roofings, controlling every step from mine to market, to the distinct advantage of every present or prospective user of a Johns-Manville Built-up Roof.

In the pages which follow are discussed the inherent qualities which make a roof dependable, long-lived and fire-resistant, and the lasting benefits which will accrue from proper materials, properly applied.

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Johns-Manville Corporation*

Johns-Manville

22 East 40th Street, New York, N. Y.

Offices in All Large Cities

JOHNS-MANVILLE

Complete

BUILT-UP ROOF SERVICE



REALIZING that no one type of built-up roof can be acceptable or usable under all conditions, and recognizing the factor of individual preference, Johns-Manville has developed a number of different types of built-up roofs and is in a position to furnish a roof to meet practically any condition or personal preference.

The various standard J-M Built-Up Roofs are tabulated and condensed specifications given on pages 12 and 13, with ratings of the Underwriters' Laboratories, Inc. The roofs are classified on the basis of quality, the kind and slope of deck, the type of felt, finish, etc. Detailed individual specifications begin on page 14.

SMOOTH-SURFACED ASBESTOS BUILT-UP ROOFS

While Johns-Manville furnishes built-up roofs of every type, the smooth-surfaced asbestos roof is recommended as the one best designed to stand up under all conditions and to give complete, trouble-free protection for the life of the building.

J-M Smooth-surfaced Asbestos Built-up Roofs are the outcome of several decades of study and experience in producing durable, fireproof, weatherproof, lightweight roofs at a moderate cost. They are suitable for practically every type of industrial building, warehouse, office building, hotel, hospital and apartment house.

They are built up of alternating layers of asphalt-saturated asbestos felt and roofing asphalt.

J-M Asbestos Felts, with which J-M Bonded Asbestos Roofs are built up, will not support combustion even when impregnated and coated with asphalt. The Underwriters' Laboratories, Inc., give Class A ratings to many different types of J-M Asbestos Roofs. They are fire-resistant to the highest degree.

J-M Bonded Roofing Asphalt—a relatively recent development in asphalt processing which has proved to be far superior to ordinary asphalts—is used on all J-M Bonded Asbestos Roofs. Tests at the Johns-Manville Research Laboratories at Manville, N. J., have demonstrated that the unusual ability of J-M Bonded Asphalt to stand up under all conditions of service will add years to the life of the roof.

ADDITIONAL J-M BONDED ROOFS

In addition to Asbestos Roofs, Johns-Manville also supplies Combination Roofs, composed of a rag base felt and asbestos finishing felts, and a complete line of Slag or Gravel-surfaced

Roofs, using tar-saturated asbestos felts, tar-saturated rag felts, or asphalt-saturated rag felts. These types of J-M Bonded Roofs are also included in the tables on pages 12 and 13.

APPROVED ROOFING CONTRACTORS INSPECTION .. BONDS .. ENDORSEMENTS

As the best results are obtained only when the proper roofing is correctly laid, Johns-Manville has appointed Approved Roofing Contractors throughout the country, whose appointments have been based upon experience, integrity and financial responsibility.

J-M INSPECTIONS ARE AVAILABLE

Johns-Manville maintains a corps of inspectors whose services are available in connection with bonded built-up roofs. This service is required in connection with every roof which is to be bonded, both before, during and after application.

BOND BY NATIONAL SURETY CORP.

All Johns-Manville Built-up Roofs, except on the Pacific Coast, will, when desired, be covered by a bond of National Surety Corp., guaranteeing the performance of the particular roof for a period of from ten to twenty years, depending on the type of roof applied. This bond is issued only on roofs laid by Johns-Manville Approved Roofing Contractors and in connection with Johns-Manville inspection service.

10-YEAR FLASHING ENDORSEMENT

Where Johns-Manville Flashing Materials are used in conjunction with Johns-Manville Roofing, a ten-year flashing endorsement will be attached to and become part of the bond, under the same conditions as are imposed for the roof.

Complete protection afforded



ASBESTOS

Asbestos—fibres of stone—fireproof, rotproof, enduring — the base of a good built-up roof. Crude asbestos fibres are here shown still attached to the serpentine rock matrix



WEATHERING TEST ON ASPHALT

After water, heat and cold were played on these samples of roofing asphalt for the equivalent of 10 years of actual weathering, J-M Bonded Roofing Asphalt (right) was still apparently as good as new

J-M Smooth-surfaced Asbestos Built-up Roofs give the best assurance of roof permanence

SINCE the primary purpose of a roof is permanent protection from the elements, it is obvious that a good roof must not only shed water, it must *stay* waterproof. And, for permanence, it must also be proof against fire and decay.

Scientific research has found no waterproofing agent better than asphalt, which has been proved to be less brittle at low temperatures and less fluid at high temperatures than any other known waterproofing material. Yet there are many kinds and grades of asphalt. In the effort to secure the permanence requisite in a good roofing asphalt, J-M research engineers have developed a processed asphalt known as J-M Bonded Roofing Asphalt, which has shown marked superiority over all other asphalts ordinarily used for such purpose.

TESTS ON J-M BONDED ROOFING ASPHALT

In a series of accelerated tests by machine weathering, the J-M Laboratories subjected samples of Bonded Roofing Asphalt and other commercial asphalts to alternating cycles of exposure to heat, rain and sub-zero temperature, equivalent to ten years of actual service. Although the samples were practically identical in appearance before testing, the illustration at the right shows how J-M Bonded Asphalt stood up when the others failed. It is this unusual permanence

which led to the adoption of J-M Bonded Roofing Asphalt as the waterproofing agent in J-M Bonded Built-up Roofs.

However, even the best asphalt cannot, alone, make a good roof. There must be a flexible reinforcement, durable and non-combustible, which can itself be impregnated with asphalt to keep it waterproof, and which at the same time will protect the asphalt from its one cause of deterioration — the drying-out action of the sun. Asbestos felt meets these requirements exactly.

ASBESTOS USED IN J-M ROOFING FELTS

Centuries ago it was found that asbestos fibres could be woven into a fireproof cloth, but only during the past 80 years has it become commercially useful. Today this basic material is used in brake lining for automobiles and trucks because it is the only fibrous material that will not burn or disintegrate under high temperatures. For the same reason, it is used in woven form in asbestos theater curtains, fire-fighting suits, gloves, etc. In combination with portland cement it is made into rigid asbestos roofing, siding and shingles, corrugated Transite for roofing and siding, pipe and underground conduit, electrical barriers, etc.

As used in built-up roofing, the asbestos fibres are first felted and then impregnated with asphalt, making a *flexible stone roofing material, imperishable and fireproof.*

by J-M Bonded Built-up Roofs

HOW THE WATERPROOFING ASPHALT IS PRESERVED BY ASBESTOS FELT

THE characteristic difference between asbestos fibre and all other natural fibres is that asbestos fibre is a solid filament, not a hollow tube. There can be no capillary action through it. This makes asbestos felt highly difficult to impregnate, since the waterproofing must be forced between and around the fibres, coating them and filling all the interstices, rather than their soaking it up with the blotterlike effect of organic fibres.

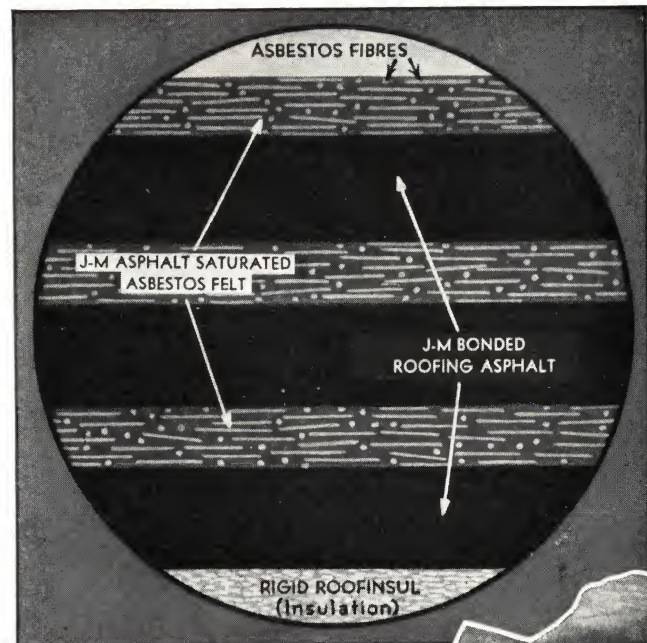
But this very lack of capillary action and consequent resistance to impregnation is the source of the protection which asbestos felt affords the vital waterproofing asphalt, once the felt is impregnated with it. The essential oils of the asphalt are protected from evaporation due to the continuous drying-out action of the sun, which so rapidly deteriorates other types of roofing, and the asbestos built-up roof *stays* waterproof. The accompanying diagram illustrating the security afforded by asbestos felt is self-explanatory.

When the asbestos felt has been impregnated with J-M Bonded Roofing Asphalt, and Bonded Roofing Asphalt used as the cementing layer between the plies of felt forming the built-up roof, the asphalt is preserved in practically its original condition. The result is a smooth-surfaced roof that *stays* waterproof for years, with minimum upkeep.

PROOF AGAINST FIRE AND DECAY

But asbestos does more than merely protect from weather. Asbestos is fire-proof and rot-proof and thus adds the other two essentials to roof permanence. Its very existence—in the oldest igneous rocks—proves its endurance against the destructive forces of fire, time and the elements.

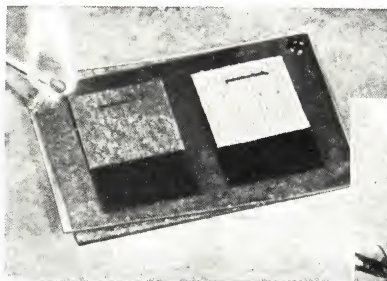
Asbestos felt is virtually felted fibres of stone. It cannot decay; it will not burn. Exhaustive tests by the Underwriters' Laboratories, which included exposure to radiant heat, burning brands and direct flame, have proved that asbestos felt,



The diagram above shows a magnified edge of a 3-ply asbestos roof. Notice how the individual fibres of asbestos felt protect the impregnating asphalt from the sun, and how each ply of asbestos roofing felt acts as a protective blanket to the underlying layer of waterproofing asphalt. (At right) If you scrape the gray surface of an asbestos roof with a pen-knife, the black asphalt appears below. You can repeat this test a dozen times in the same spot and obtain the same results

even when impregnated and coated with asphalt as used in a J-M Built-Up Roof, will not support combustion. J-M Asbestos Roofs are so fire-resistant that, in every type, there will be found roofs that carry the Underwriters' Class A rating, which takes the base rate of insurance.

A demonstration of how Asbestos Felt resists fire



You can make this experiment in your own office with a J-M Roofing "Sandwich." This consists of pieces of J-M Asbestos Felt and rag felt stapled between sheets of a highly inflammable material. Lay the "sandwich" on a fireproof surface and light it. Instantly it bursts into flame. In a few seconds it goes out—yet in that time the organic rag felt is reduced to ashes, while the enduring mineral J-M Asbestos Felt remains, slightly sooty perhaps, but unharmed. A "sandwich" for this test will be promptly mailed on request at any Johns-Manville office.

9 Advantages of a J-M Smooth-Surfaced Asbestos Roof

1 PROVED BY TEST OF TIME

The lasting qualities of a Johns-Manville Smooth-surfaced Asbestos Roof are clearly demonstrated on pages 8 and 9 in which are listed actual installations of this type of roof which have withstood the elements for 20 years or more.

2 CAN BE APPLIED TO EVERY ROOF WHICH WILL DRAIN WATER

We do not recommend the use of dead level roof decks. Roof decks should be graded to proper drains to prevent possibility of areas which will not drain. Undrained spots become unhealthful and breeding grounds for mosquitoes, as well as creating unequal exposures of different parts of the roof surface to the elements which creates the likelihood of unequal strains developing in the surface.

3 NO PROTECTIVE COVERING NEEDED

Asbestos Roofing Felts do not require the use of slag or gravel for the protection of the asphalt and the felts. The asbestos in the felt prevents the sun from causing the deterioration or drying-out of the asphalt in and between the felts.

4 HIGHLY FIRE-RESISTANT

The J-M 20-Year Smooth-surfaced Asbestos Roof is given a Class A rating, and the similar J-M 15-Year Roof a Class B rating, by the National Board of Fire Underwriters.

5 DECAY-PROOF

Asbestos felts, being made from rock fibre and asphalt, can not decay. The roof built up from these felts and asphalts will withstand heat and cold and the constant destructive action of the elements under all conditions.

6 LEAKS EASILY LOCATED

An unforeseen accident or unusual expansion and contraction of the roof deck may damage any roof surface and cause it to leak. With a J-M Smooth-surfaced Asbestos Roof, any such damaged areas can be quickly located.

7 EASY TO REPAIR

The construction of J-M Smooth-surfaced Asbestos Roofs is such that repairs can be made quickly and inexpensively.

8 NO EXCESSIVE WEIGHT

The smooth-surfaced asbestos felt roof finish does not require the protection of slag or gravel, therefore saving in the construction necessary to support the weight of such materials.

9 FIRST COST IS LAST COST FOR WATERPROOFING

Everything included in the built-up roof construction is a waterproofing in itself.



The Critical Part of a Roof is the Flashing

MORE than at any other place on a roof, a leak is apt to occur at the junction formed by the roof deck and a vertical surface, such as a parapet wall, skylight curb or wall of an adjacent building. Most roof decks are separate units from these vertical surfaces and are constructed of different materials. There is a natural weakness at the angle, due to shrinkage of the material, expansion or contraction, or other movement of the building.

In addition to this it must be remembered that a parapet wall stands up above the roof where driving rain beats against it from both sides as well as the top. Consequently, the wall absorbs a certain amount of moisture. For this reason it is most desirable that the flashing should go all the way through the wall. This method isolates the roof deck and keeps water from seeping down through the wall and under the roofing.

APPLICATION OF ROOFING AND FLASHING SHOULD BE TWO DISTINCT OPERATIONS

Johns-Manville has designed several types of flashing so that any of the different conditions encountered in a roof can be handled successfully. In designing these flashings, the application of roofing and flashing have definitely been made two separate operations. The laying of the roofing felts should be completed before applying the flashing. Before any work is done, a "cant strip" or "V"-shaped piece of lumber or other nailing base is installed at the angle formed by the roof and the vertical surface, so that instead of a sharp angle there is formed a gradual slope.

J-M FLASHING BECOMES A PART OF THE WALL

Johns-Manville Asbestos Flashing Felts are made from the same basic materials as the asbestos roofing felts. The waterproofing or cementing agent is Johns-Manville Asbestile, a heavy-bodied, plastic cement composed of asbestos fibres, asphalt and other mineral ingredients, which hardens after application and *becomes a part of the wall itself*.

"THROUGH-THE-WALL" FLASHING PROVIDES GREATER PROTECTION THAN ANY OTHER KIND

A Johns-Manville Asbestos Flashing Felt is first applied to the wall with asphalt and turned out over the finished roof to form the *base* flashing. This felt must be nailed to the wall. The edge of the flashing felt *on the roof* is then reinforced with felt strips. The *cap* flashing is then installed. This consists of running one asbestos felt and one ply of saturated fabric from a point one inch back from the front face of the



More leaks occur at the flashing than at any other part of a roof. THROUGH-THE-WALL FLASHING is the safest known method of providing a permanently weather-tight job at this vulnerable point.

wall, through the wall, over a key, and then extending down the wall, lapping the top of the base felt, all applied with Asbestile. This forms a complete seal for the roof structure.

Naturally, there must be variations of this "through-the-wall" method of flashing in order to take care of different methods of construction and different materials. In the case of a concrete parapet wall, where it is impossible to go through the wall itself, the cap flashing is carried up over the concrete wall and under the coping. In cases where metal cap flashing is used, the Johns-Manville base flashing is installed as described above and the metal cap flashing should go through the wall, for adequate protection.

IMPORTANCE OF FLASHING EMPHASIZES NEED FOR COMPETENT APPLICATION

It is obvious that inferior or short-cut methods of flashing will weaken the entire roof from a waterproofing standpoint. This is another reason why such care is taken in selecting Johns-Manville Approved Roofing Contractors. They will apply the flashing in accordance with Johns-Manville recommendations, assuring leakproof, fireproof roofs at every point.

Detailed specifications and drawings on the Johns-Manville System of Flashing will be found on pages 33 to 35.

Some J-M Asbestos Roofs which are still in



A 25-YEAR OLD AT KANSAS CITY, MO.

In 1912, this J-M roof was applied on the building of the Kansas City Star. Says the owner, "Certain portions are subjected to foot traffic, but it has given excellent service with practically no cost for repairs or maintenance."



A 25-YEAR OLD AT CHICAGO, ILL.

This J-M Asbestos Roof was laid in 1913 for Reid, Murdock & Company, 325 No. La-Salle St. The roof has given very satisfactory service.



A 25-YEAR OLD AT SOUTH BEND, IND.

This J-M Smooth-surfaced Asbestos Roof has been protecting the Oliver Farm Equipment Company factory for a full quarter of a century.

Johns-Manville Smooth-surfaced Asbestos Built-up Roofs have an unusual performance record, as evidenced by the nineteen roofs illustrated or listed on these two pages. Every one of these roofs has had a service life of 20 years or longer . . . and all are still in good condition.

Note the pleasing gray appearance of the roofs. As has been explained on page 5, this gray surface is the top-most layer of the asbestos fibres in the asbestos felt which blankets the vital waterproofing asphalt and protects it from the deteriorating action of the sun.

In addition to the roofs illustrated, among the many other Johns-Manville roofs with service records of 20 years or more, are the following typical examples:

A 36-YEAR OLD

At Newark, N. J.

Building No. 4 of General Leather Company. Says Chief Engineer Krill, "During that entire period it has not required any maintenance whatever."

THREE 25-YEAR OLDS

At San Francisco, Cal.

The J-M Smooth-surfaced Asbestos Roof on the John Deere Plow Company plant was applied in 1912—and is still giving satisfactory service.

At Detroit, Mich.

Detroit Baseball Company reports, "Your asbestos roofs were installed in 1912 on right and left field pavilions at Navin Park. They have withstood weather and the added punishment of thousands of baseballs striking them. The material appears in good condition."

At Louisville, Ky.

American Medicinal Spirits Company writes, "The performance more than speaks for itself."

BELOW . . . A 20-YEAR OLD AT WATERTOWN, N. Y.

Bagley and Sewall Company report that their J-M Smooth-surfaced Asbestos Roofs appear to be in condition to last many years longer.



their prime, though more than 20 years old

FOUR 24-YEAR OLDS

At Seattle, Wash.

The roof of the Bell Street Dock, Port of Seattle, is still in good condition, although it was applied as long ago as 1913.

At Bluefield, W. Va.

Huff, Andrews and Thomas Company writes about their J-M roof, "Except for some shovel cuts caused by the removal of snow last winter, it is in excellent condition. . . . Overhead expense has been reduced to a minimum. . . . Anticipate many more years of service on this roof."

At Chicago, Ill.

Sears, Roebuck & Co. (Grocery Building) report two 24-year old J-M Asbestos Roofs still "in good condition."

At Los Angeles, Cal.

Agent for Brockman Building reports "repairs to J-M roofs have probably not exceeded \$10 during all this time." Roof applied in 1913.

TWO 23-YEAR OLDS

At Seattle, Wash.

The world war had just started when a J-M roof was applied on the Lincoln High School in Seattle. The asbestos felts are in splendid shape today.

At Los Angeles, Cal.

New Method Laundry states that their J-M roof "has given continuous service and is still in excellent condition."

IN CIRCLE—A 22-YEAR OLD AT LOS ANGELES, CAL.

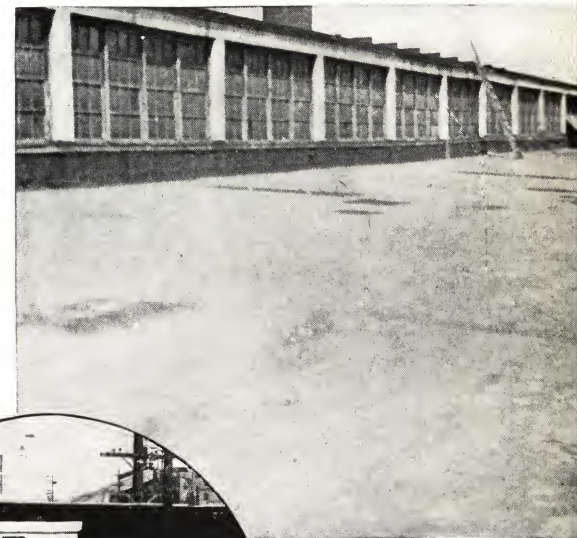
On March 4, 1915, this J-M roof was laid on the warehouse of the Hauser Packing Company. "Good for many more years of service."

BELOW—A 24-YEAR OLD AT CINCINNATI, OHIO

"Nearly a quarter of a century," says the American Valve and Meter Company of their J-M Smooth-surfaced Asbestos Roof.

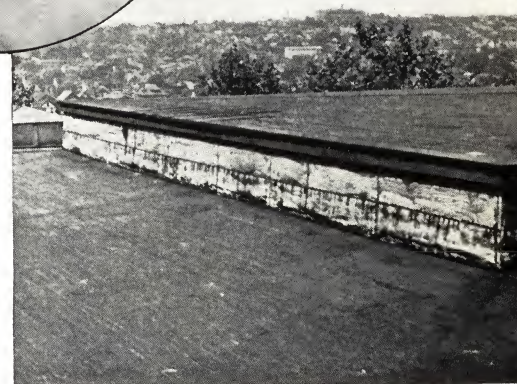
A 27-YEAR OLD AT BEACH GROVE, IND.

This J-M Smooth-surfaced Asbestos Roof was applied in 1910. The photograph shows that it is still in good condition and will undoubtedly give many more years of satisfactory service.



A 24-YEAR OLD AT DETROIT, MICH.

In 1913 a J-M Asbestos Roof was laid for the Enterprise Foundry Company. And now they state, "This roof looks good for many more years."



A 20-YEAR OLD AT SEATTLE, WASH.

Meany Hall, University of Washington, is protected by this J-M Smooth-surfaced Asbestos Roof, in good condition after 20 years.

6 Good Reasons for specifying a



APPLYING J-M ROOFINSUL

Roof insulation not only saves fuel and assures comfortable interior temperatures, but also protects both the roof deck and the built-up roof itself

JOHNS-MANVILLE ROOFINSUL

Light in Weight — High in Insulating Value

J-M Roofinsul was designed especially for use as insulation over roof decks, principally under J-M Bonded Asbestos Built-up Roofs. It is light in weight and has a high insulating value, and is also rigid and structurally strong. J-M Roofinsul has a high resistance to moisture absorption. It lasts for years in the open and, when covered with a J-M Bonded Asbestos Roof, will last as long as the roof itself.

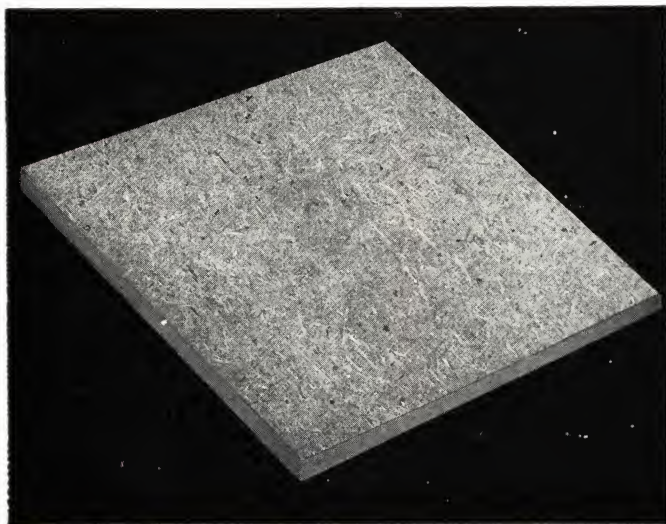
Any desired number of layers of J-M Roofinsul can be

installed to give any needed insulating efficiency, without adding appreciably to the weight of the roof.

J-M Roofinsul is furnished 24" x 48". The standard thickness is 1/2". If sheets of greater thickness than 1/2" are desired, two or more sheets are stapled together, with a 3/4" ship-lap joint on all four edges. Weight approximately 0.8 lb. per sq. ft., 1/2" thick.

Heat Losses in Roof Construction for Insulated and Uninsulated Roofs

Type of Roof	Thickness of J-M Roofinsul	Heat Loss in B.t.u. per sq. ft., per deg. F. temperature difference per hour
7/8" wood deck and smooth-surfaced built-up roof	None	.533
	1/2"	.296
	1"	.205
	1 1/2"	.157
	2"	.127
1 5/8" wood deck and smooth-surfaced built-up roof	None	.381
	1/2"	.242
	1"	.178
	1 1/2"	.140
	2"	.116
4" concrete and smooth-surfaced built-up roof	None	.676
	1/2"	.336
	1"	.223
	1 1/2"	.167
	2"	.134
5" concrete and smooth-surfaced built-up roof	None	.625
	1/2"	.323
	1"	.217
	1 1/2"	.164
	2"	.132



EFFICIENT, STRONG J-M ROOFINSUL

J-M Roofinsul-insulated Roof

1. Prevents Condensation and Roof Drip

J-M Roofinsul prevents condensation on the under side of the deck and eliminates discoloration of ceilings and the annoyance and damage caused by roof drip.

Regardless of how carefully a wood deck may be constructed, vapors penetrate the planking, condense on the underside of the built-up roof and rot starts at the top, unseen, and works down. While the problem of rot can be eliminated by the use of concrete, that of condensation and roof-drip remains.

When air comes in contact with a cooler surface, such as the underside of a roof, its temperature is lowered. If the temperature of the surface is below the dew point of the water vapor in the air, the excess moisture is deposited on the surface as condensation. Insulation of the proper thickness will keep the temperature of the surface above the dew point and prevent the deposition of moisture.

2. Protects Deck against Rot and Corrosion

By preventing condensation, J-M Roofinsul protects the deck against rot and corrosion. When the deck is of concrete or other non-combustible material, it reduces the danger of cracking (commonly caused by sudden temperature changes) and thereby tends to prevent moisture from reaching the reinforcing steel members.

3. Prevents Damage to Roofing Felts through deck movement

J-M Roofinsul protects the roofing felts themselves. All

roof decks will move, to some extent, under temperature changes. When this cycle of alternate expansion and contraction continues over a long period of time, any cracks in the deck may eventually be transmitted to the built-up roof unless there is an intervening layer of insulation. J-M Roofinsul not only minimizes movement of the deck by keeping its temperature more uniform, but also provides sufficient resiliency to take up strains, due to any movement which does occur, and prevent their transmission to the felts, thus prolonging the life of the roof.

4. Provides Closer Interior Temperature Control

J-M Roofinsul permits closer control over interior temperatures both in summer and winter, assuring more comfortable, uniform working conditions throughout the year. Uniform interior temperatures are also a vital necessity in the operation of many modern industrial processes.

5. Improves Working Conditions

Insulation with J-M Roofinsul effectively retards the passage of heat through the roofs, thus saving on fuel and air conditioning bills. See the heat loss table on the opposite page.

6. Lowers Heating And Air-Conditioning Costs

On new construction, J-M Roofinsul makes it possible to reduce considerably the investment in heating and air conditioning equipment. And on either new or old buildings, it appreciably lowers operating costs on such equipment.



DECAY FROM MOISTURE CONDENSATION

Moisture condensation and the resultant decay made the removal of these old wood decks imperative. J-M Roofinsul would have prevented this expense

Index and Condensed Specifications for

Pitch of Roof per Foot, in Inches	Bond, Years (See Note)	J-M Specification Number	Page No.	Surface	Number of Plies and Kind of Felt	Number of Moppings Asphalt [A] or Pitch [P]	Weight of Materials, in Pounds per Square								Total Weight per Square, in Pounds			Underwriters' Rating
							Sheathing Paper	Felts		Asphalt	Pitch	Roof Coating	Gravel	Slag	Smooth Surface or Crushed Slate	Gravel Surface	Slag Surface	
							Asbestos	Rag										
WITHOUT INSULATION																		
WOOD or PRE-CAST GYPSUM DECK																		
Smooth Surface																		
¼ to 9	20	100	14	Smooth	One 55-lb. Asphalt-Saturated Asbestos Felt Three 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	115	—	90	—	8	—	—	213	—	—	A
¼ to 9	15	103	14	Smooth	One 55-lb. Asphalt-Saturated Asbestos Felt Two 20-lb. Asphalt-Saturated Asbestos Felts	A-2	—	95	—	60	—	8	—	—	163	—	—	A
¼ to 9	15	200	15	Smooth	One No. 45 Asphalt-Saturated Rag Felt Two 20-lb. Asphalt-Saturated Asbestos Felts	A-2	—	40	50	60	—	8	—	—	158	—	—	—
¼ to 9	10	202	15	Smooth	One No. 30 Asphalt-Saturated Rag Felt Two 20-lb. Asphalt-Saturated Asbestos Felts	A-2	—	40	33½	60	—	8	—	—	141½	—	—	—
¼ to 9	20	205	△	Smooth	One No. 45 Asphalt-Saturated Rag Felt Three 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	60	50	90	—	8	—	—	208	—	—	—
Gravel or Slag Surface																		
¼ to 2	20	300	16	Gravel or Slag	Five 15-lb. Asphalt-Saturated Rag Felts	A-4	—	—	81	145	—	—	400	300	—	626	526	A
¼ to 2	15	304	16	Gravel or Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-3	—	—	65	115	—	—	400	300	—	580	480	A
2 to 4	10	301	17	Slag	Five 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	81	150	—	—	—	250	—	—	481	A*
¼ to 2	20	600	**17	Gravel or Slag	One ply Rosin-Sized Paper (over wood only) Five 15-lb. Tar-Saturated Asbestos Felts	P-4	5	—	81	—	150	—	400	300	—	636	536	A
¼ to 2	15	604	**18	Gravel or Slag	One ply Rosin-Sized Paper (over wood only) Four 15-lb. Tar-Saturated Asbestos Felts	P-3	5	—	65	—	125	—	400	300	—	595	495	A
2 to 6	10	601	**18	Slag	One ply Rosin-Sized Paper (over wood only) Five 15-lb. Tar-Saturated Asbestos Felts	P-4 A-1	5	—	81	45	60	—	—	250	—	—	441	A*
Crushed Slate Surface																		
1 to 4	10	402	△	Crushed Slate	Three 15-lb. Asphalt-Saturated Rag Felts Two 50-lb. Asphalt-Saturated Slatekote Felts	A-4	—	—	149	120	—	—	—	—	269	—	—	C
4 to 9	10	400	△	Crushed Slate	Two 15-lb. Asphalt-Saturated Rag Felts Two 50-lb. Asphalt-Saturated Slatekote Felts	A-2	—	—	133	60	—	—	—	—	193	—	—	C
NON-COMBUSTIBLE DECK (except Pre-cast Gypsum or Steel)																		
Smooth Surface																		
¼ to 9	20	101	22	Smooth	One 55-lb. Asphalt-Saturated Asbestos Felt Two 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	95	—	90	—	8	—	—	193	—	—	A
¼ to 9	15	201	22	Smooth	One No. 45 Asphalt-Saturated Rag Felt Two 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	40	50	90	—	8	—	—	188	—	—	—
¼ to 9	10	203	23	Smooth	One No. 30 Asphalt-Saturated Rag Felt Two 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	40	33½	90	—	8	—	—	171½	—	—	—
Smooth Surface under Promenade Tile																		
¼ to ½	20	112	△	Smooth	Two plies Rosin-Sized Paper Four 20-lb. Asphalt-Saturated Asbestos Felts	A-5	10	80	—	160	—	—	—	—	—	250	—	—
¼ to 1	§	612	**27	Smooth	Five 15-lb. Tar-Saturated Asbestos Felts	P-6	—	81	—	—	200	—	—	—	—	281	—	—
Gravel or Slag Surface																		
¼ to 2	20	302	24	Gravel or Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	175	—	—	400	300	—	640	540	A
¼ to 2	15	305	25	Gravel or Slag	Three 15-lb. Asphalt-Saturated Rag Felts	A-4	—	—	49	145	—	—	400	300	—	594	494	A
2 to 4	10	303	25	Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	165	—	—	—	250	—	—	480	A*
¼ to 2‡	20	602	**26	Gravel or Slag	Four 15-lb. Tar-Saturated Asbestos Felts	P-5	—	65	—	—	175	—	400	300	—	640	540	A
¼ to 2‡	15	605	**26	Gravel or Slag	Three 15-lb. Tar-Saturated Asbestos Felts	P-4	—	49	—	—	150	—	400	300	—	599	499	A
2 to 6‡	10	603	**27	Slag	Four 15-lb. Tar-Saturated Asbestos Felts	P-4 A-1	—	65	—	45	65	—	—	250	—	—	425	A*
Crushed Slate Surface																		
1 to 4	10	403	△	Crushed Slate	Three 15-lb. Asphalt-Saturated Rag Felts Two 50-lb. Asphalt-Saturated Slatekote Felts	A-5	—	—	149	150	—	—	—	—	299	—	—	C
4 to 9	10	401	△	Crushed Slate	One 15-lb. Asphalt-Saturated Rag Felt Two 50-lb. Asphalt-Saturated Slatekote Felts	A-3	—	—	116	90	—	—	—	—	206	—	—	C
		33 to 35		J-M BASE and CAP FLASHING														
△ Complete specification not included in this catalog but furnished on request. * Class A Underwriters' rating on pitches up to and including 3" per foot. † ¼" to 2" over Poured Gypsum Decks; ¼" to 1" over Book Tile or Poured or Precast Concrete Decks. ‡ 2" to 6" over Poured Gypsum Decks; 1" to 6" over Poured Concrete Decks. § Bond term on application.																		
** Available, also, employing rag felt instead of asbestos felt. See note appended to the specification on the page number indicated.																		
Note: No roof bonds are issued on the Pacific Coast.																		

Johns-Manville Bonded Built-up Roofs

6
6

Pitch of Roof per Foot, in Inches	Bond, Years (See Note)	J-M Specification Number	Page No.	Surface	Number of Plies and Kind of Felt	Number of Moppings Asphalt [A] or Pitch [P]	Weight of Materials, in Pounds per Square								Total Weight per Square, in Pounds			Underwriters' Rating
							Sheathing Paper	Asbestos	Felts	Rag	Asphalt	Pitch	Roof Coating	Gravel	Slag	Smooth Surface or Crushed Slate	Gravel Surface	
WITH INSULATION																		
APPLICATION OF INSULATION																		
		500	31	Application of J-M Roofinsul Over Wood Decks														
		501	32	Application of J-M Roofinsul Over Non-Combustible Decks														
		502	32	Application of J-M Roofinsul Over Steel Decks														
WOOD or PRE-CAST GYPSUM DECK																		
Smooth Surface																		
¼ to 9	20	104	19	Smooth	Four 20-lb. Asphalt-Saturated Asbestos Felts	A-4	—	80	—	120	—	8	—	—	208	—	—	A
¼ to 9	15	106	19	Smooth	Three 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	60	—	90	—	8	—	—	158	—	—	B
Gravel or Slag Surface																		
¼ to 2	20	302	24	Gravel or Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	175	—	—	400	300	—	640	540	A
¼ to 2	15	305	25	Gravel or Slag	Three 15-lb. Asphalt-Saturated Rag Felts	A-4	—	—	49	145	—	—	400	300	—	594	494	A
2 to 4	10	303	25	Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	165	—	—	—	250	—	—	480	A*
¼ to 2	20	606	**20	Gravel or Slag	One Ply Rosin-Sized Paper (over wood only) Four 15-lb. Tar-Saturated Asbestos Felts	P-5	5	65	—	—	175	—	400	300	—	645	545	A
¼ to 2	15	608	**21	Gravel or Slag	One Ply Rosin-Sized Paper (over wood only) Three 15-lb. Tar-Saturated Asbestos Felts	P-4	5	49	—	—	150	—	400	300	—	604	504	B
2 to 6	10	610	**21	Slag	One Ply Rosin-Sized Paper (over wood only) Four 15-lb. Tar-Saturated Asbestos Felts	P-3 A-1	5	65	—	45	105	—	—	250	—	—	470	A*
NON-COMBUSTIBLE DECK (except Pre-cast Gypsum or Steel)																		
Smooth Surface																		
¼ to 9	20	105	23	Smooth	Four 20-lb. Asphalt-Saturated Asbestos Felts	A-4	—	80	—	120	—	8	—	—	208	—	—	A
¼ to 9	15	107	24	Smooth	Three 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	60	—	90	—	8	—	—	158	—	—	A
Gravel or Slag Surface																		
¼ to 2	20	302	24	Gravel or Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	175	—	—	400	300	—	640	540	A
¼ to 2	15	305	25	Gravel or Slag	Three 15-lb. Asphalt-Saturated Rag Felts	A-4	—	—	49	145	—	—	400	300	—	594	494	A
2 to 4	10	303	25	Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	165	—	—	—	250	—	—	480	A*
¼ to 2	20	607	**28	Gravel or Slag	Four 15-lb. Tar-Saturated Asbestos Felts	P-5	—	65	—	—	175	—	400	300	—	640	540	A
¼ to 2	15	609	**29	Gravel or Slag	Three 15-lb. Tar-Saturated Asbestos Felts	P-4	—	49	—	—	150	—	400	300	—	599	499	A
2 to 6	10	611	**29	Slag	Four 15-lb. Tar-Saturated Asbestos Felts	P-3 A-1	—	65	—	45	94	—	—	250	—	—	454	A*
STEEL DECK																		
Smooth Surface																		
½ to 9	20	108	30	Smooth	Four 20-lb. Asphalt-Saturated Asbestos Felts	A-4	—	80	—	120	—	8	—	—	208	—	—	A
½ to 9	15	109	30	Smooth	Three 20-lb. Asphalt-Saturated Asbestos Felts	A-3	—	60	—	90	—	8	—	—	158	—	—	—
Gravel or Slag Surface																		
¼ to 2	20	302	24	Gravel or Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	65	175	—	—	400	300	—	640	540	A
¼ to 2	15	305	25	Gravel or Slag	Three 15-lb. Asphalt-Saturated Rag Felts	A-4	—	—	49	145	—	—	400	300	—	594	494	A
¼ to 2	20	607	**28	Gravel or Slag	Four 15-lb. Tar-Saturated Asbestos Felts	P-5	—	65	—	—	175	—	400	300	—	640	540	A
¼ to 2	15	609	**29	Gravel or Slag	Three 15-lb. Tar-Saturated Asbestos Felts	P-4	—	49	—	—	150	—	400	300	—	599	499	A
* Class A Underwriters' rating on pitches up to and including 3" per foot. □ ¼" to 2" over Poured Gypsum Decks; ¼" to 1" over Poured Concrete Decks. ‡ 2" to 6" over Poured Gypsum Decks; 1" to 6" over Poured Concrete Decks.																		
** Available, also, employing rag felt instead of asbestos felt. See note appended to the specification on the page number indicated.																		
Note: No roof bonds are issued on the Pacific Coast																		

* Class A Underwriters' rating on pitches up to and including 3" per foot.
 □ ¼" to 2" over Poured Gypsum Decks; ¼" to 1" over Poured Concrete Decks.
 ‡ 2" to 6" over Poured Gypsum Decks; 1" to 6" over Poured Concrete Decks.

** Available, also, employing rag felt instead of asbestos felt. See note appended to the specification on the page number indicated.

Note: No roof bonds are issued on the Pacific Coast

SPECIFICATION No. 100

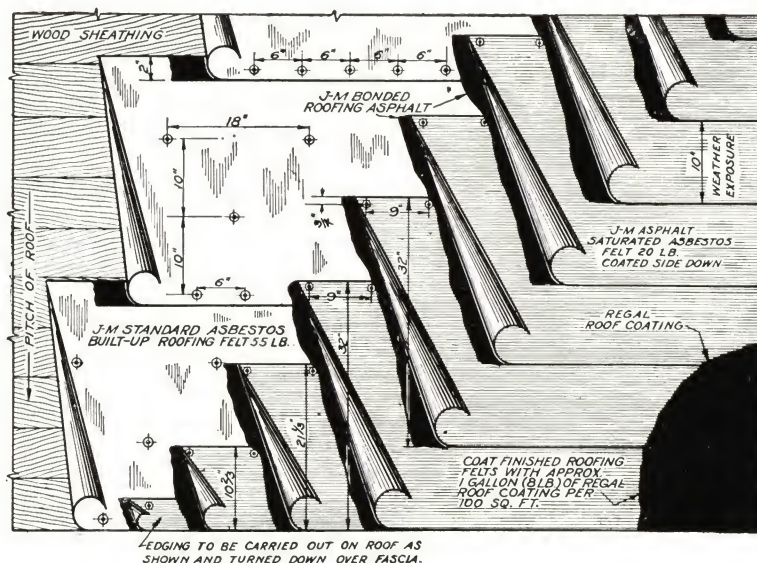
J-M 20-YEAR ROOF OVER WOOD DECKS

Surface: SMOOTH

Felts: ASBESTOS

Waterproofing: ASPHALT

Inclines: ¼ in. to 9 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M Standard Asbestos Built-up Roofing Felt.	55 lb.
FINISHING FELTS: 3 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	60 lb.
ASPHALT: J-M Bonded Roofing Asphalt.	90 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the 55-lb. asbestos felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, all felts shall

be laid parallel to the pitch. All felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay one thickness of the 55-lb. asbestos felt, lapping the sheets 2", sealing the laps with the asphalt and nailing at 6" centers through the laps and at 18" centers through the longitudinal center of each sheet, in two lines spaced 10" apart, the nails to be staggered.

Over the 55-lb. asbestos felt, lay three plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 22" over the preceding one, mopping the full width under each with the asphalt and nailing at 9" centers adjacent to the back edge.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

SPECIFICATION No. 103

J-M 15-YEAR ROOF OVER WOOD DECKS

Surface: SMOOTH

Waterproofing: ASPHALT

Felts: ASBESTOS

Inclines: ¼ in. to 9 in. per ft.

BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M Standard Asbestos Built-up Roofing Felt	55 lb.
FINISHING FELTS: 2 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	40 lb.
ASPHALT: J-M Bonded Roofing Asphalt.	60 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the 55-lb. asbestos felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot all felts shall be laid parallel to the pitch. All felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay one thickness of the 55-lb. asbestos felt, lapping the sheets 2", sealing the laps with the asphalt and nailing at 6" centers through the laps and at 18" centers through the longitudinal center of each sheet, in two lines spaced 10" apart, the nails to be staggered.

Over the 55-lb. asbestos felt, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt and nailing at 9" centers adjacent to the back edge.

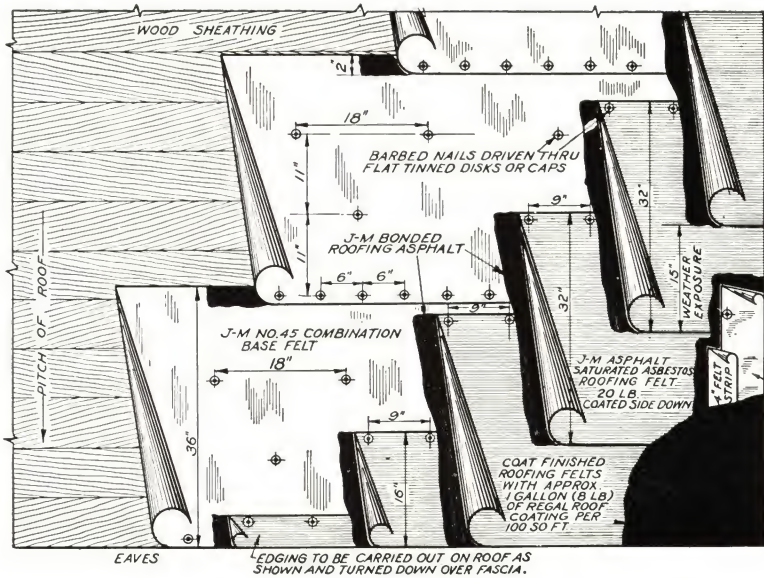
Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.



J-M 15-YEAR ROOF OVER WOOD DECKS

Surface: SMOOTH

Felts: ASBESTOS and RAG

Waterproofing: ASPHALT

Inclines: $\frac{1}{4}$ in. to 9 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M No. 45 Base Felt (Rag Felt, 50 lbs. per 108 sq. ft.)	50 lb.
FINISHING FELTS: 2 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	40 lb.
ASPHALT: J-M Bonded Roofing Asphalt	60 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is $3''$ to the foot or less, the 50-lb. rag felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over $3''$ to the foot, all felts shall

be laid parallel to the pitch. All felts shall be turned up $2''$ on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay one thickness of the 50-lb. rag felt, lapping the sheets $2''$, sealing the laps with the asphalt and nailing at $6''$ centers through the laps and at $18''$ centers through the longitudinal center of each sheet in two lines spaced $11''$ apart, the nails to be staggered.

Over the 50-lb. rag felt, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet $17''$ over the preceding one, mopping the full width under each with the asphalt and nailing at $9''$ centers adjacent to the back edge.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

SPECIFICATION No. 202

J-M 10-YEAR ROOF OVER WOOD DECKS

Surface: SMOOTH Felts: ASBESTOS and RAG

Waterproofing: ASPHALT

Inclines: $\frac{1}{4}$ in. to 9 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M No. 30 Combination Base Felt (Rag Felt, $33\frac{1}{2}$ lbs. per 108 sq. ft.)	$33\frac{1}{2}$ lb.
FINISHING FELTS: 2 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	40 lb.
ASPHALT: J-M Bonded Roofing Asphalt	60 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is $3''$ to the foot or less, the $33\frac{1}{2}$ -lb. rag felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over $3''$ to the foot, all felts shall be laid parallel to the pitch. All felts shall be turned up $2''$ on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay one thickness of the $33\frac{1}{2}$ -lb. rag felt, lapping the sheets $2''$, sealing the laps with the asphalt and nailing at $6''$ centers through the laps and at $18''$ centers through the longitudinal center of each sheet in two lines spaced $11''$ apart, the nails to be staggered.

Over the $33\frac{1}{2}$ -lb. rag felt, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet $17''$ over the preceding one, mopping the full width under each with the asphalt and nailing at $9''$ centers adjacent to the back edge.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Ten-Year Guaranty Bond.

SPECIFICATION No. 300

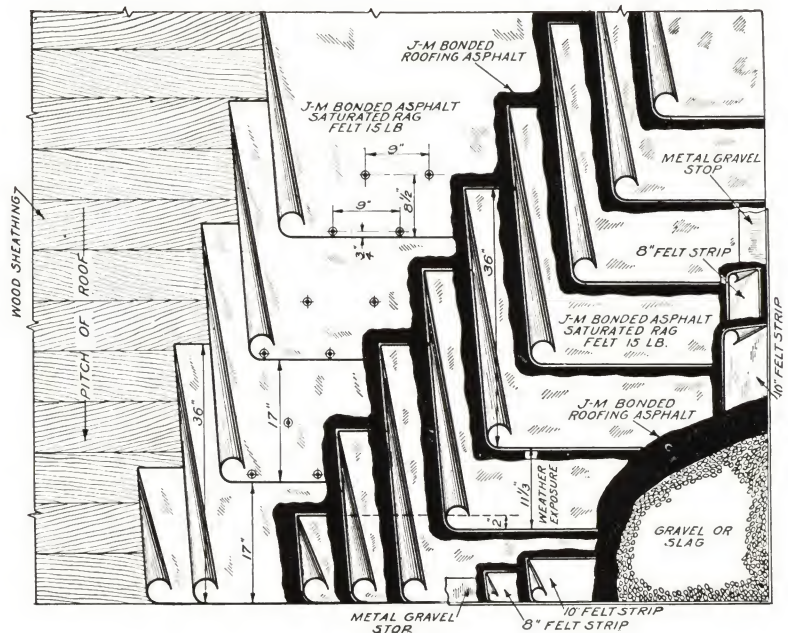
J-M 20-YEAR ROOF OVER WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG or GRAVEL

Felts: RAG

Waterproofing: ASPHALT

Inclines: ¼ in. to 2 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 5 layers of J-M 15-lb. Bonded Asphalt-Saturated Rag Felt (16¼ lb. per 108 sq. ft.).....	81 lb.
ASPHALT: J-M Bonded Roofing Asphalt.....	145 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical surfaces without cementing thereto. All nails shall be driven through flat metal disks.

Roofing—Lay two plies of the 15-lb. rag felt, lapping each sheet 19" over the preceding one and nailing through the laps in two lines spaced 7¾" apart, the first line to adjoin the edge of the sheet, the nails to be spaced at 9" centers and staggered.

Over these felts lay three additional plies of the 15-lb. rag felt, lapping each sheet 24⅓" over the preceding one, mopping the full width under each with the asphalt.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

SPECIFICATION No. 304

J-M 15-YEAR ROOF OVER WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG or GRAVEL

Felts: RAG

Waterproofing: ASPHALT

Inclines: ¼ in. to 2 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M 15-lb. Bonded Asphalt-Saturated Rag Felt (16¼ lb. per 108 sq. ft.).....	65 lb.
ASPHALT: J-M Bonded Roofing Asphalt.....	115 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay two plies of the 15-lb. rag felt, lapping each sheet 19" over the preceding one and nailing through the laps in two lines spaced 7¾" apart, the first line to adjoin the edge of the sheet, the nails to be spaced at 9" centers and staggered.

Over these felts lay two additional plies of the 15-lb. rag felt, lapping each sheet 19" over the preceding one, mopping the full width under each with the asphalt.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

SPECIFICATION No. 604*

J-M 15-YEAR ROOF OVER WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG or GRAVEL

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

Inclines: $\frac{1}{4}$ in. to 2 inches per foot

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 704

FELTS: (Change name of felt to "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER (used on wood deck only): 1 layer (5 lb. per 100 sq. ft.)	5 lb.
*FELTS: 4 layers of J-M 15-lb. Tar-Saturated Asbestos Felt (16 $\frac{3}{4}$ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch	125 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical masonry surfaces and 4" on all vertical wood surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

SPECIFICATION No. 601*

J-M 10-YEAR ROOF OVER WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG

Waterproofing: PITCH (TAR)

Felts: ASBESTOS

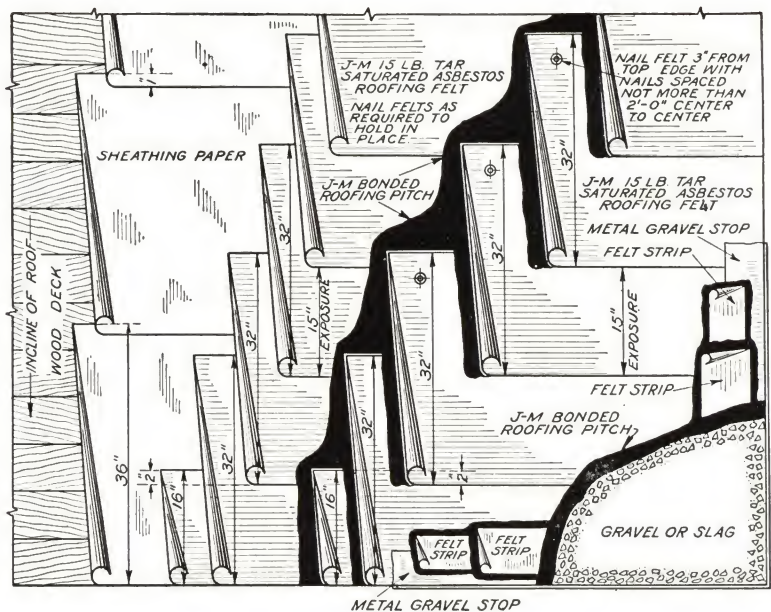
Inclines: 2 in. to 6 in. per ft.

BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER (used on wood deck only): 1 layer (5 lb. per 100 sq. ft.)	5 lb.
*FELTS: 5 layers of J-M 15-lb. Tar-Saturated Asbestos Felt (16 $\frac{3}{4}$ lb. per 108 sq. ft.)	81 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	60 lb.
ASPHALT: J-M Bonded Roofing Asphalt (for top surfacing)	45 lb.
SURFACING: Slag	250 lb.

ROOF DECK

(Copy from Specification No. 604, above.)



Roofing—If application is over wood sheathing, lay one thickness of sheathing paper, lapping the sheets not less than 1".

Lay two plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 17" over the preceding one and nailing sufficiently to hold in place.

Over these felts lay two additional plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 17" over the preceding one, mopping the full width under each with the pitch and nailing at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

INSTALLATION

General—(copy from Specification No. 604, above.)

Roofing—If application is over wood sheathing, lay one thickness of sheathing paper, lapping the sheets not less than 1".

Lay five plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 26" over the preceding one, mopping under each with the pitch to a width of 18" starting 2" from the exposed edge. Nail each sheet at 12" centers, 10" from the back edge.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

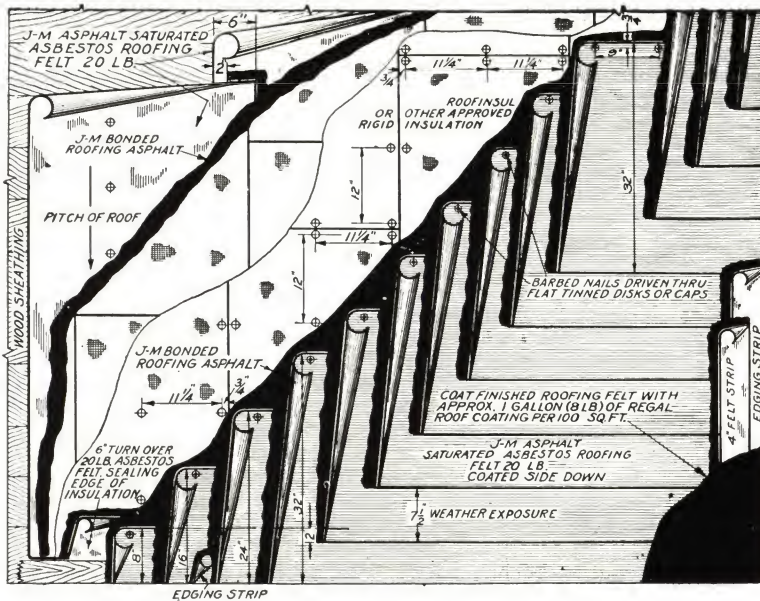
(Copy from Specification No. 604, above, except change to "Ten-Year.")

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 701

FELTS: (Change name of felt to "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 104



J-M 20-YEAR ROOF OVER INSULATION ON WOOD DECKS

Surface: SMOOTH

Felts: ASBESTOS

Waterproofing: ASPHALT

Insulation: ROOFINSUL

Inclines: $\frac{1}{4}$ in. to 9 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M 20-lb. Asbestos Asphalt-Saturated Felt..	80 lb.
(An additional ply of 20-lb. Asbestos Felt is specified for application under the insulation, in Specification No. 500. See page 31.)	
ASPHALT: J-M Bonded Roofing Asphalt (for mopping between felts)	120 lb.
For mopping insulation over felt.....	30 lb.
For mopping each additional ply of insulation.....	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. $\frac{1}{2}$ " thick)	
For each layer of insulation	100 sq. ft.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, the felts shall be laid parallel to the pitch. The

roof felts shall be turned up 2" on all vertical surfaces without being cemented thereto. The felt applied under insulation shall be similarly turned up a distance 6" greater than the thickness of such insulation and shall overhang all roof edges a similar amount. All nails shall be driven through flat metal disks.

Insulation—(Copy from J-M Standard Specification No. 500, page 31.)

Roofing—Lay four plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet $24\frac{1}{2}$ " over the preceding one, mopping the full width under each with the asphalt and, if pitch of roof exceeds 3" to the foot, nailing at 9" centers adjacent to the back edge.

Coat the entire surface with roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

SPECIFICATION No. 106

J-M 15-YEAR ROOF OVER INSULATION ON WOOD DECKS

Surface: SMOOTH

Waterproofing: ASPHALT

Felts: ASBESTOS

Insulation: ROOFINSUL

Inclines: $\frac{1}{4}$ in. to 9 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 3 layers of J-M 20-lb. Asbestos Roofing Felt.....	60 lb.
(An additional ply of 20-lb. Asbestos Felt is specified for application under the insulation in Specification No. 500. See page 31.)	
ASPHALT: J-M Bonded Roofing Asphalt (for mopping between felts)	90 lb.
For mopping insulation over felt.....	30 lb.
For mopping each additional ply of insulation.....	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. $\frac{1}{2}$ " thick)	
For each layer of insulation	100 sq. ft.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(Copy from Specification No. 104, above.)

INSTALLATION

General—(Copy from Specification No. 104, above.)

Insulation—(Copy from J-M Standard Specification No. 500, page 31.)

Roofing—Lay three plies of the 20-lb. asbestos felt, lapping each sheet 22" over the preceding one, mopping the full width under each with the asphalt and, if pitch of roof exceeds 3" to the foot, nailing at 9" centers adjacent to the back edge.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

(Copy from Specification No. 104, above, except change to "Fifteen-Year".)

SPECIFICATION No. 606*

**J-M 20-YEAR ROOF
OVER INSULATION
ON WOOD OR
PRE-CAST GYPSUM
DECKS**

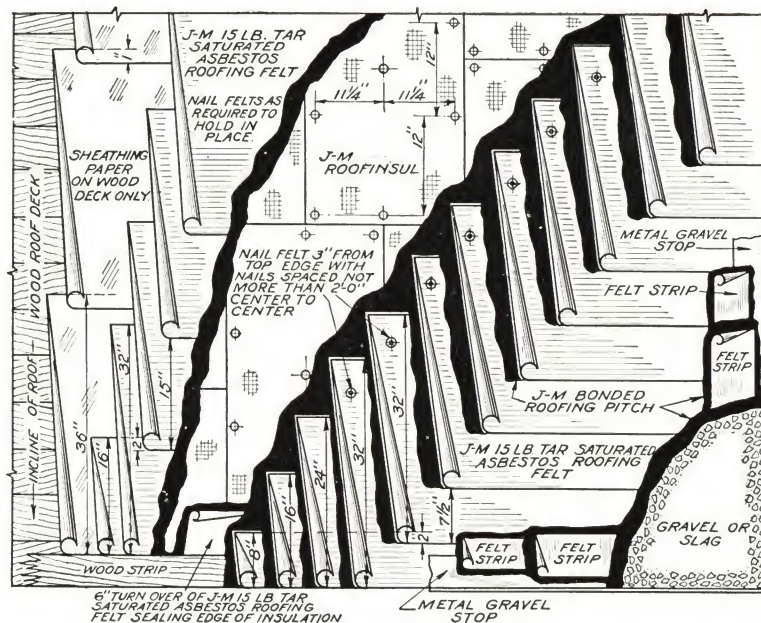
Surface: SLAG or GRAVEL

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

Insulation: ROOFINSUL

Inclines: ¼ in. to 2 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER (used over wood deck only): 1 layer (5 lb. per 100 sq. ft.).....	5 lb.
*FELTS: (Under Insulation) 2 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.).....	32½ lb.
*FELTS: (For Built-Up Roof) 4 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.).....	65 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	175 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation.....	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick)	
For each layer of insulation	100 sq. ft.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in a satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All felts applied over the insulation shall be turned up 2" on all vertical masonry surfaces and 4" on all vertical wood surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Felts Under Insulation—If application is over wood sheathing, lay one thickness of sheathing paper, lapping the sheets not less than 1".

Lay two plies of the 15-lb. tar-saturated felt, lapping each sheet 17" over the preceding one and nailing sufficiently to hold in place. These felts shall be turned up on, but not cemented to, all vertical surfaces to a height 6" greater than the thickness of the insulation and shall overhang all roof edges a similar amount.

Insulation—Lay the Roofinsul with the rough side down and with all end joints broken, mopping the full width under each sheet with the pitch. The edges of the sheets at the joints shall be thoroughly sealed with the pitch. The insulation shall be isolated into areas approximately 30' 0" square by path-strippings of one ply of the 15-lb. tar-saturated roofing felt, mopped the full width with the pitch, to extend not less than 4" over the edge of the insulation in place and

not less than 4" under the adjoining insulation to be laid. Nail each sheet of the insulation at 12" centers adjacent to the longitudinal edges and staggered through the longitudinal center.

If the insulation is to be applied in more than one layer, succeeding layers shall be applied in the same manner as the first layer (*unless high humidity and condensation conditions do not exist, in which event the moppings between layers may be omitted*), the sheets of each layer to break joints with those of the preceding layer, with all nailing done through the top layer.

The upturned felt at vertical surfaces and roof edges shall be turned down and mopped solidly to the insulation.

Insulation shall not be left exposed to the weather. No more insulation shall be laid down than can be completely covered with the roofing felts on the same day. At the end of the day's work, roofing felts shall be turned down over the exposed edges of the insulation and mopped solidly.

Roofing—Lay four plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 24½" over the preceding one, mopping the full width under each with the pitch and nailing at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 706

FELTS: (*Change name of felt to "J-M 15-lb. Bonded Tar-Saturated Rag Felt."*)

SPECIFICATION No. 608*

J-M 15-YEAR ROOF OVER INSULATION ON WOOD OR PRE-CAST GYPSUM DECKS

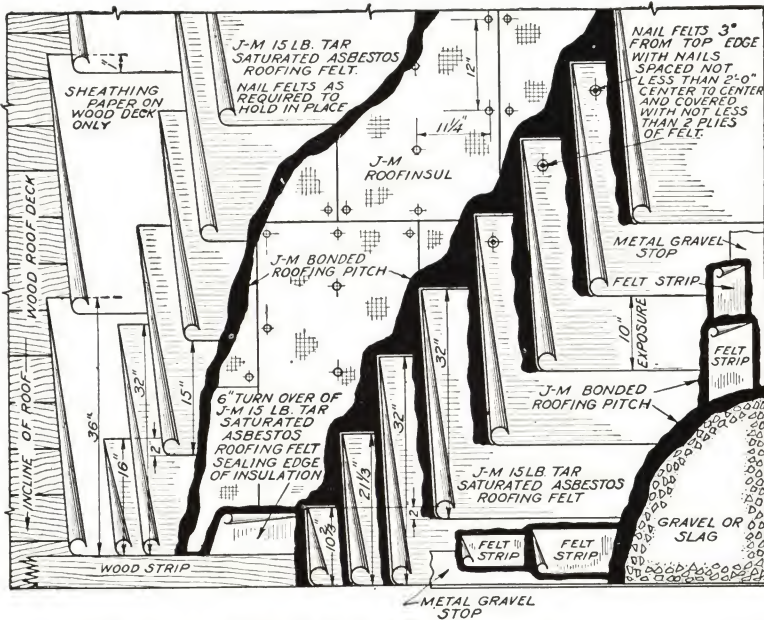
Surface: SLAG or GRAVEL

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

Insulation: ROOFINSUL

Inclines: ¼ in. to 2 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER (used over wood deck only): 1 layer (5 lb. per 108 sq. ft.)	5 lb.
*FELTS: (Under Insulation) 2 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	32½ lb.
*FELTS: (For Built-Up Roof) 3 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	49 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	150 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick)	100 sq. ft.
For each layer of insulation	400 lb.
SURFACING: Gravel or Slag	300 lb.

ROOF DECK

(Copy from Specification No. 606, opposite.)

INSTALLATION

General—(Copy from Specification No. 606, opposite.)

Felts Under Insulation—(Copy from Specification No. 606, opposite.)

Insulation—(Copy from Specification No. 606, opposite.)

Roofing—Lay three plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 22" over the preceding one, mopping the full width under each with the pitch and nailing at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

(Copy from Specification No. 606, opposite, except change to "Fifteen-Year.")

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 708

FELTS: (Change name of felt to "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 610*

J-M 10-YEAR ROOF OVER INSULATION ON WOOD OR PRE-CAST GYPSUM DECKS

Surface: SLAG Waterproofing: PITCH (TAR)

Felts: ASBESTOS Insulation: ROOFINSUL

Inclines: 2 in. to 6 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER (used over wood deck only): 1 layer (5 lb. per 108 sq. ft.)	5 lb.
*FELTS: (Under Insulation) 2 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	32½ lb.
*FELTS: (For Built-Up Roofs) 4 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	105 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
ASPHALT: J-M Bonded Roofing Asphalt (for top surfacing)	45 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick)	100 sq. ft.
For each layer of insulation	400 lb.
SURFACING: Slag	250 lb.

ROOF DECK

(Copy from Specification No. 606, opposite.)

INSTALLATION

General—(Copy from Specification No. 606, opposite.)

Felts Under Insulation—(Copy from Specification No. 606, opposite.)

Insulation—(Copy from Specification No. 606, opposite.)

Roofing—Lay four plies of the 15-lb. tar-saturated felt, lapping each sheet 24½" over the preceding one, mopping under each with the pitch to a width of 30" starting 2" from the exposed edge. Nail each sheet at 12" centers, 10" from the back edge.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

(Copy from Specification No. 606, opposite, except change to "Ten-Year".)

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 710

FELTS: (Change name of felt to "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

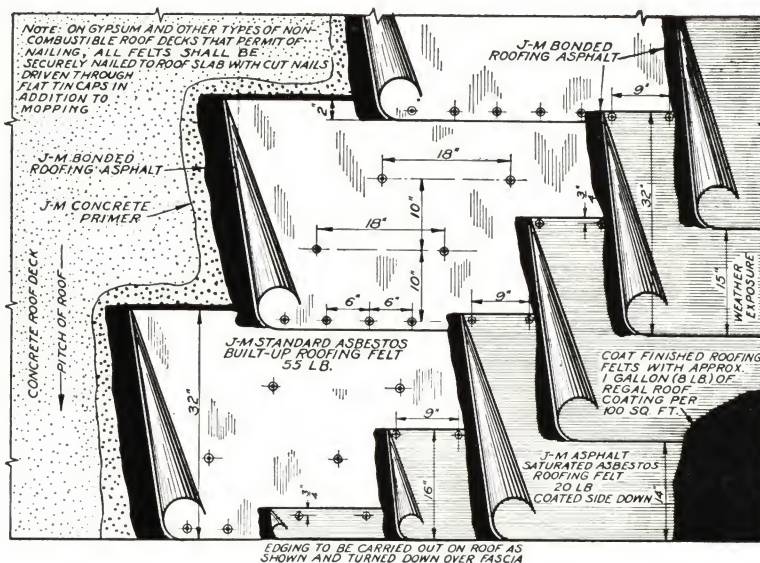
J-M 20-YEAR ROOF OVER NON-COMBUSTIBLE DECKS

Surface: SMOOTH

Felts: ASBESTOS

Waterproofing: ASPHALT

Inclines: ¼ in. to 9 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M Standard Asbestos Built-Up Roofing Felt	55 lb.
FINISHING FELTS: 2 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	40 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	90 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the 55-lb. asbestos felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, all felts shall be laid parallel to the pitch. All felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Coat all surfaces, which are to receive the roofing, with the primer and allow to dry.

Lay one thickness of the 55-lb. asbestos felt, lapping the sheets 2", mopping the full width under each with the asphalt and, if roof construction permits, nailing at 6" centers through the laps and at 18" centers through the longitudinal center of each sheet in two lines spaced 10" apart, the nails to be staggered.

Over the 55-lb. asbestos felt, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 9" centers adjacent to the back edge.

With nailing strips provided as required, nail each sheet of the 55-lb. asbestos felt at 6" centers at each nailing strip. Nail each sheet of the 20-lb. asbestos felt at each nailing strip ¾" from the back edge.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

SPECIFICATION No. 201

J-M 15-YEAR ROOF OVER NON-COMBUSTIBLE DECKS

Surface: SMOOTH Waterproofing: ASPHALT
Felts: RAG Inclines: ¼ in. to 9 ins. per ft.

BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M No. 45 Base Felt (Rag Felt, 50 lb. per 108 sq. ft.)	50 lb.
FINISHING FELTS: 2 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	40 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	90 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be

properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—(Copy from Specification No. 101, above, except change "55-lb. asbestos felt" to "50-lb. rag felt.")

Roofing—(Copy from Specification No. 101, above, changing "55-lb. asbestos felt" to "50-lb. rag felt," and changing the spacing of the nails from 10" to 11".)

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

SPECIFICATION No. 203

J-M 10-YEAR ROOF OVER NON-COMBUSTIBLE DECKS

Surface: SMOOTH Felts: ASBESTOS and RAG
Waterproofing: ASPHALT
Inclines: ¼ in. to 9 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M No. 30 Combination Base Felt) Rag Felt, 33½ lb. per 108 sq. ft.)	33½ lb.
FINISHING FELTS: 2 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	40 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	90 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—(Copy from Specification No. 101, opposite, except change "55-lb. asbestos felt" to "33½-lb. rag felt.")

Roofing—(Copy from Specification No. 101, opposite, changing "55-lb. asbestos felt" to "33½-lb. rag felt," and changing the spacing of the nails from 10" to 11".)

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Ten-Year Bond.

SPECIFICATION No. 105

J-M 20-YEAR ROOF OVER INSULATION ON NON-COMBUSTIBLE DECKS

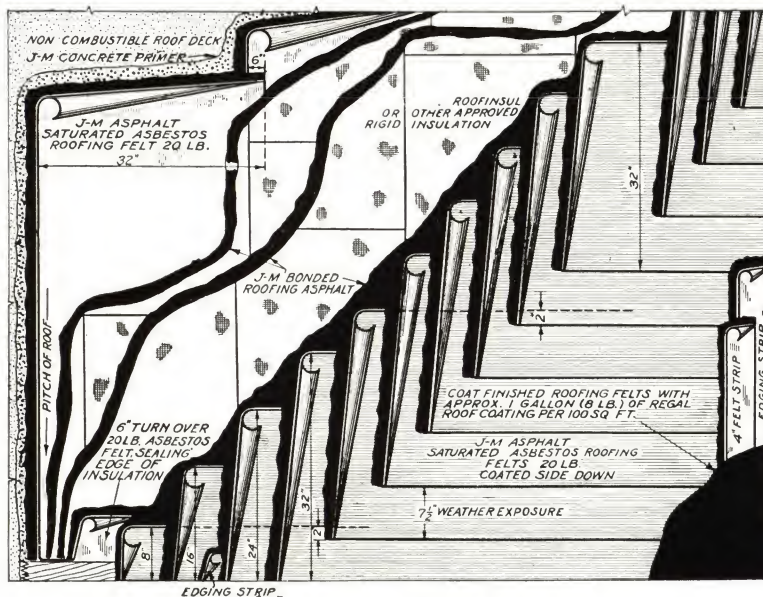
Surface: SMOOTH

Felts: ASBESTOS

Waterproofing: ASPHALT

Insulation: ROOFINSUL

Inclines: ¼ in. to 9 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	80 lb.
(An additional ply of 20-lb. Asbestos Felt is specified for application under the insulation, in Specification No. 501. See page 32.)	
ASPHALT: J-M Bonded Roofing Asphalt (for mopping between felts)	120 lb.
For mopping felt to deck	30 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick)	100 sq. ft.
For each layer of insulation	
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, the felts shall be laid parallel to the pitch. The roof felts shall be turned up 2" on all vertical surfaces without being cemented thereto. The felt applied under insulation shall be similarly turned up a distance 6" greater than the thickness of such insulation

and shall overhang all roof edges a similar amount. All nails shall be driven through flat metal disks.

Insulation—(Copy from J-M Standard Specification No. 501, page 32.)

Roofing—Lay four plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 24½" over the preceding one, mopping the full width under each with the asphalt or, if job conditions make it desirable to apply the roofing in two operations, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt, and over these felts lay two additional plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt.

If pitch of roof exceeds 3" to the foot, and roof construction permits, each sheet shall be nailed at 9" centers adjacent to the back edge. With nailing strips provided as required, nail each sheet at each nailing strip, all nails to be placed so as to be covered by not less than two plies of felt.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

(Copy from Specification No. 101, opposite.)

SPECIFICATION No. 107

**J-M 15-YEAR ROOF
OVER INSULATION ON
NON-COMBUSTIBLE
DECKS**

Surface: SMOOTH Waterproofing: ASPHALT
Felts: ASBESTOS Insulation: ROOFINSUL
Inclines: ¼ in. to 9 inches per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 3 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	60 lb.
(An additional ply of 20-lb. Asbestos Felt is specified for application under the insulation, in Specification No. 501. See page 32.)	
ASPHALT: J-M Bonded Roofing Asphalt (for mopping between felts)	90 lb.
For mopping felt to deck	30 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick)	
For each layer of insulation	100 sq. ft.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces

smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, the felts shall be laid parallel to the pitch. The roof felts shall be turned up 2" on all vertical surfaces without being cemented thereto. The felt applied under insulation shall be similarly turned up a distance 6" greater than the thickness of such insulation and shall overhang all roof edges a similar amount. All nails shall be driven through flat metal disks.

Insulation—(Copy from J-M Specification No. 501, page 32.)

Roofing—Lay three plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 22" over the preceding one, mopping the full width under each with the asphalt.

If pitch of roof exceeds 3" to the foot, and roof construction permits, each sheet shall be nailed at 9" centers adjacent to the back edge. With nailing strips provided as required, nail each sheet at each nailing strip, all nails to be so placed as to be covered by not less than two plies of felt.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

(Copy from Specification No. 305, opposite.)

SPECIFICATION No. 302

**J-M 20-YEAR ROOF
OVER BOOK TILE,
POURED OR PRECAST
CONCRETE OR POURED
GYPSUM DECKS**

Surface: SLAG or GRAVEL

Felts: RAG

Waterproofing: ASPHALT

Inclines: ¼ in. to 2 inches per foot

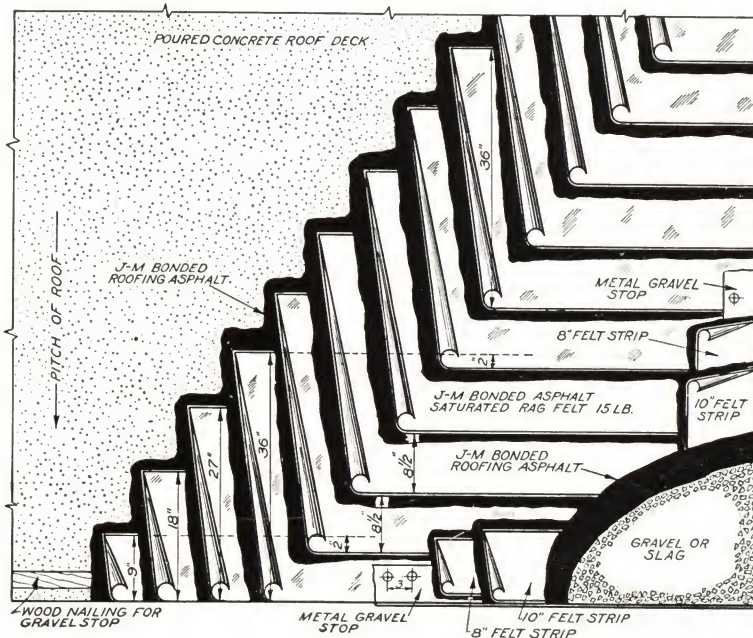
BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M 15-lb. Bonded Asphalt-Saturated Rag Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	175 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.



INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—If application is over gypsum, coat all surfaces, which are to receive the roofing, with the primer and allow to dry.

Lay four plies of the 15-lb. rag felt, lapping each sheet 27½" over the preceding one, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 12" centers, 3" from the back edge.

If roof construction is of precast concrete, the asphalt applied to the roof surface shall be omitted for a width of 4" each side of all joints between the slabs.

Over the entire surface pour a uniform coating of the asphalt and

embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

SPECIFICATION No. 305

J-M 15-YEAR ROOF OVER BOOK TILE, POURED OR PRECAST CONCRETE OR POURED GYPSUM DECKS

Surface: SLAG and GRAVEL

Felts: RAG

Waterproofing: ASPHALT

Inclines: ¼ in. to 2 in. per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 3 layers of J-M 15-lb. Bonded Asphalt-Saturated Rag Felt (16¼ lb. per 108 sq. ft.)	49 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	145 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—If application is over gypsum, coat all surfaces, which are to receive the roofing, with the primer and allow to dry.

Lay three plies of the 15-lb. rag felt, lapping each sheet 24⅔" over the preceding one, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 12" centers, 3" from the back edge.

If roof construction is of precast concrete, the asphalt applied to the roof surface shall be omitted for a width of 4" each side of all joints between the slabs.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

SPECIFICATION No. 303

J-M 10-YEAR ROOF OVER POURED OR PRECAST CONCRETE OR POURED GYPSUM DECKS

Surface: SLAG

Waterproofing: ASPHALT

Felts: RAG

Inclines: 2 in. to 4 in. per ft.

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M 15-lb. Bonded Asphalt-Saturated Rag Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PRIMER: J-M Concrete Primer (8 lbs. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	165 lb.
SURFACING: Slag	250 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—If application is over gypsum, coat all surfaces, which are to receive the roofing, with the primer and allow to dry.

Lay four plies of the 15-lb. rag felt, lapping each sheet 27½" over the preceding one, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 12" centers, 3" from the back edge.

If roof construction is of precast concrete, the asphalt applied to the roof surface shall be omitted for a width of 4" each side of all joints between the slabs.

With nailing strips provided as required, nail each sheet at each nailing strip with two nails spaced 8" and 10" respectively from the back edge.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Ten-Year Guaranty Bond.

SPECIFICATION No. 602*

J-M 20-YEAR ROOF OVER BOOK TILE, POURED OR PRECAST CONCRETE DECKS

Inclines: $\frac{1}{4}$ in. to 1 inch per foot

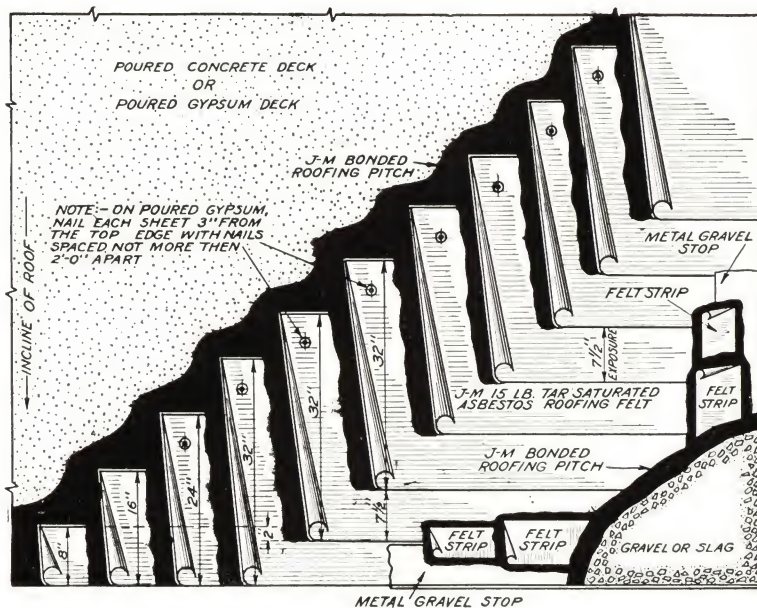
OVER POURED GYPSUM DECKS

Inclines: $\frac{1}{4}$ in. to 2 inches per foot

Surface: SLAG or GRAVEL

Felts: ASBESTOS

Waterproofing: PITCH (TAR)



BILL OF MATERIALS PER 100 SQ. FT.

*FELTS: 4 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16 $\frac{1}{4}$ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch	175 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay four plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 24 $\frac{1}{2}$ " over the preceding one, mopping the full width under each with the pitch. If roof construction is of poured gypsum, nail each sheet at 24" centers, 3" from the back edge.

If roof construction is of precast concrete, the pitch applied to the roof surface shall be omitted for a width of 4" each side of all joints between the slabs.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 702

Felts: (Change name of felt to "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 605*

J-M 15-YEAR ROOF OVER BOOK TILE, POURED OR PRECAST CONCRETE DECKS

Inclines: $\frac{1}{4}$ in. to 1 inch per foot

OVER POURED GYPSUM DECKS

Inclines: $\frac{1}{4}$ in. to 2 inches per foot

Surface: SLAG or GRAVEL

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

BILL OF MATERIALS PER 100 SQ. FT.

*FELTS: 3 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16 $\frac{1}{4}$ lb. per 108 sq. ft.)	49 lb.
PITCH: J-M Bonded Roofing Pitch	150 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(Copy from Specification No. 602, above.)

INSTALLATION

General—(Copy from Specification No. 602, above.)

Roofing—Lay three plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 22" over the preceding one, mopping the full width under each with the pitch. If roof construction is of poured gypsum, nail each sheet at 24" centers, 3" from the back edge.

If roof construction is of precast concrete, the pitch applied to the roof surface shall be omitted for a width of 4" each side of all joints between the slabs.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

(Copy from Specification No. 602, above, except change to "Fifteen-Year.")

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 705

Felts: (Change name of felt to "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 603*

J-M 10-YEAR ROOF OVER POURED CONCRETE DECKS

Inclines: 1 in. to 6 inches per foot

OVER POURED GYPSUM DECKS

Inclines: 2 ins. to 6 inches per foot

Surface: SLAG

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

BILL OF MATERIALS PER 100 SQ. FT.

*FELTS: 4 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	65 lb.
ASPHALT: J-M Bonded Roofing Asphalt (for top surfacing)	45 lb.
SURFACING: Slag	250 lb.

ROOF DECK

(Copy from Specification No. 602, opposite.)

INSTALLATION

General—(Copy from Specification No. 602, opposite.)

Roofing—Lay four plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 24½" over the preceding one. These felts shall be cemented to the roof by path-moppings of the pitch, such moppings to be run parallel to the incline, to be not less than 12" nor more than 18" wide, the distance between to be not more than twice the width of such moppings. These felts shall also be cemented to each other continuously by mopping under each with the pitch to a width of 18", starting 2" from the exposed edge. If roof construction permits, nail each sheet at 12" centers, 10" from the back edge.

With nailing strips provided as required, nail each sheet at each nailing strip with two nails spaced 8" and 10" respectively from the back edge.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

(Copy from Specification No. 602, opposite, except change to "Ten-Year".)

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 703

FELTS: (Change name of felt to "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 612*

J-M BUILT-UP ROOF UNDER PROMENADE TILE OVER CONCRETE DECKS

Surface: SMOOTH

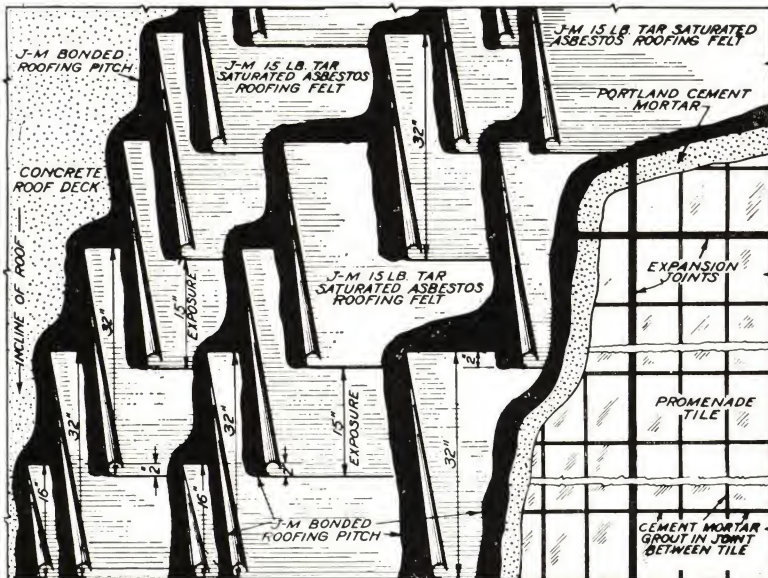
Felts: ASBESTOS

Waterproofing: PITCH (TAR)

Inclines: ¼ in. to 1 inch per foot

BILL OF MATERIALS PER 100 SQ. FT.

*FELTS: 5 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	81 lb.
PITCH: J-M Bonded Roofing Pitch	200 lb.
FLASHING: Copper	
SURFACING: 6" x 9" x 1" Promenade Tile	



ROOF DECK

General—(Copy from Specification No. 602, opposite.)

INSTALLATION

General—(Copy from Specification No. 602, opposite.)

Roofing—Coat the roof deck with bonded pitch and lay two plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 17" over the preceding one and mopping the full width under each with the pitch. Then apply two additional layers of the 15-lb. tar-saturated felts, cementing them to the roof surface and to each other in the same manner as the first two plies, and again coat the entire roof surface with the pitch.

Immediately preceding the laying of the tile, thoroughly clean the roof surface and mop with bonded pitch into which, while hot, embed one additional layer of the 15-lb. tar-saturated felt, lapping each sheet 2" over the previously laid sheet. Then coat the entire surface with bonded pitch.

Promenade Tile—On top of the Built-up Roof, lay the promenade tile in a bedding of portland cement mortar not less than 1" thick, with expansion joints in both directions on 20 ft. centers, and also at all walls, curbs and other vertical surfaces. Expansion joints shall be not less than 1" wide and shall extend through the tile and cement bed to the Built-up Roof, and shall be filled with J-M Expansion Joint Filler, poured while hot. All joints between the tile, other than expansion joints, shall be grouted with portland cement mortar.

(If a bond is required, consult Johns-Manville.)

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 712

FELTS: (Change name of felt to "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 607*

J-M 20-YEAR ROOF OVER INSULATION ON POURED CONCRETE DECKS

Inclines: ¼ in. to 1 inch per foot

ON POURED GYPSUM DECKS

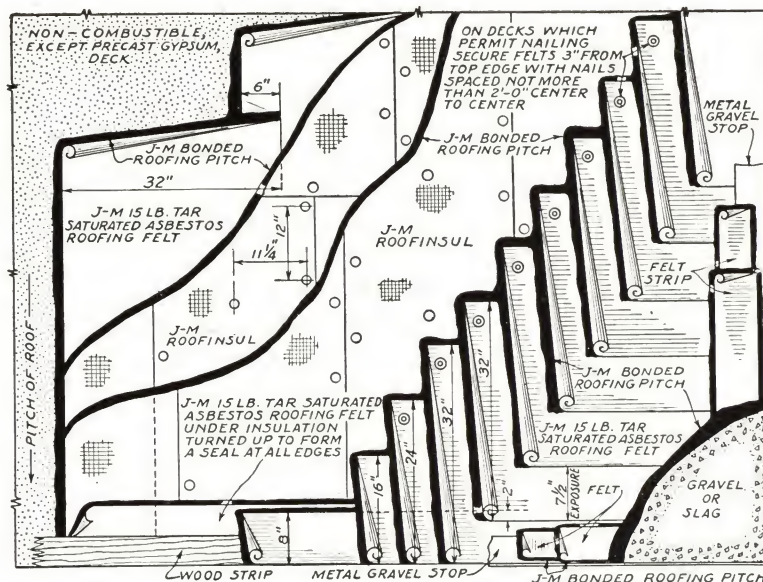
Inclines: ¼ in. to 2 inches per foot

Surface: SLAG or GRAVEL

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

Insulation: ROOFINSUL



BILL OF MATERIALS PER 100 SQ. FT.

*FELTS: (Under Insulation) 1 layer of J-M 15-lb. Tar-Saturated Asbestos Felt (16¼ lb. per 108 sq. ft.)	16¼ lb.
*FELTS: (In Built-Up Roof) 4 layers of J-M 15-lb. Tar-Saturated Asbestos Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	175 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick)	
For each layer of insulation	100 sq. ft.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—All felts applied over the insulation shall be turned up 2" on all vertical masonry surfaces and 4" on all vertical wood surfaces, without being cemented thereto. All nails shall be driven through flat metal disks.

Felt Under Insulation—Lay one ply of the 15-lb. tar-saturated felt, lapping the sheets 6", mopping the full width under each with the pitch. This felt shall be turned up on, but not cemented to, all vertical surfaces to a height 6" greater than the thickness of the insulation and shall overhang all roof edges a similar amount.

Insulation—Lay the Roofinsul with the rough side down and with all end joints broken, mopping the full width under each sheet with the pitch. The edges of the sheets at the joints shall be thoroughly sealed with the pitch. The insulation shall be isolated into areas approximately 30' 0" square by path-strippings of one ply of the 15-lb. tar-saturated felt, mopped the full width with the pitch, to extend not less than 4" over the edge of the insulation in place and not less than 4" under the adjoining insulation to be laid.

If the roof construction is of poured gypsum, nail each sheet of the insulation at 12" centers, adjacent to the longitudinal edges and staggered through the longitudinal center.

If the insulation is to be applied in more than one layer, succeeding layers shall be applied and cemented in the same manner as the first layer, the sheets of each layer to break joints with those of the preceding layer, with all nailing done through the top layer.

The overhanging felt at roof edges shall be turned over and mopped solidly to the insulation.

Insulation shall not be left exposed to the weather. No more insulation shall be laid than can be completely covered with the roofing felts on the same day. At the end of the day's work, roofing felts shall be turned down over the exposed edges of the insulation and mopped solidly to the insulation.

Roofing—Lay four plies of 15-lb. tar-saturated felt, lapping each sheet 24½" over the preceding one, mopping the full width under each with the pitch. If roof construction is of poured gypsum, nail each sheet at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Not less than 230 lbs. of the pitch shall be used per 100 sq. ft. of completed roof.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

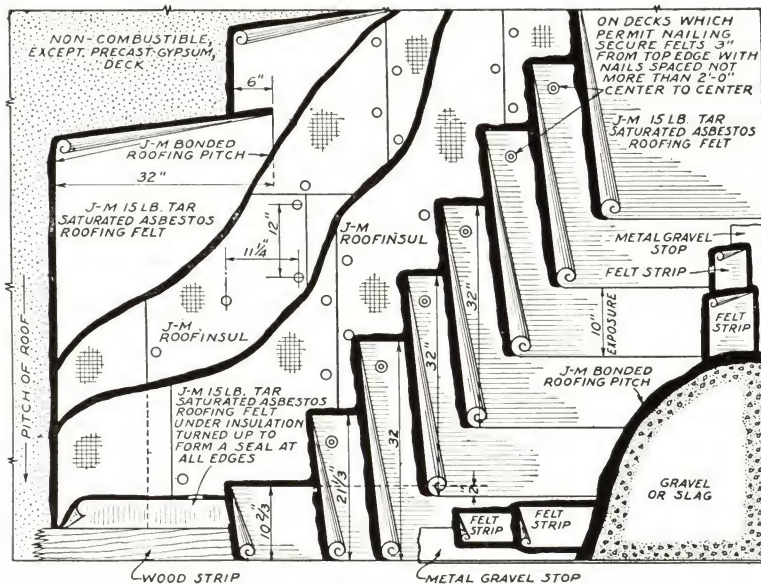
The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 707

FELTS: (Change name of felt to "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 609*



J-M 15-YEAR ROOF OVER INSULATION ON POURED CONCRETE DECKS

Inclines: ¼ in. to 1 inch per foot

ON POURED GYPSUM DECKS

Inclines: ¼ in. to 2 inches per foot

Surface: SLAG or GRAVEL

Felts: ASBESTOS

Waterproofing: PITCH (TAR)

Insulation: ROOFINSUL

BILL OF MATERIALS PER 100 SQ. FT.

*FELT: (Under Insulation) 1 layer of J-M 15-lb. Tar-Saturated Asbestos Roofing Felts (16¼ lb. per 108 sq. ft.)	16¼ lb.
*FELTS: (In Built-Up Roof) 3 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per sq. ft.)	49 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	150 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick)	100 sq. ft.
For each layer of insulation	400 lb.
SURFACING: Gravel	300 lb.
or Slag	300 lb.

ROOF DECK

(Copy from Specification No. 607, opposite.)

INSTALLATION

Insulation—(Copy from Specification No. 607, opposite.)

Felt Under Insulation—(Copy from Specification No. 607, opposite.)

Insulation—(Copy from Specification No. 607, opposite.)

Roofing—Lay three plies of the 15-lb. tar-saturated roofing felt,

lapping each sheet 22" over the preceding one, mopping the full width under each with the pitch. If roof construction is of poured gypsum, nail each sheet at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel, or 300 lbs. of slag, for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

(Copy from Specification No. 607, opposite, except change to "Fifteen-Year.")

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 709

FELTS: (Change name of felt to "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 611*

J-M 10-YEAR ROOF OVER INSULATION on Poured Concrete Decks

Inclines: 1 in to 6 inches per foot

on Poured Gypsum Decks

Inclines: 2 ins. to 6 inches per foot

Surface: SLAG Waterproofing: PITCH (TAR)

Felts: ASBESTOS Insulation: ROOFINSUL

BILL OF MATERIALS PER 100 SQ. FT.

*FELT: (Under Insulation) 1 layer of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	16¼ lb.
*FELTS: (In Built-Up Roof) 4 layers of J-M 15-lb Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch (for mopping between felts)	94 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
ASPHALT: J-M Bonded Roofing Asphalt (for top surfacing)	45 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. ½" thick)	100 sq. ft.
For each layer of insulation	400 lb.
SURFACING: Slag	250 lb.

ROOF DECK

(Copy from Specification No. 607, opposite.)

INSTALLATION

General—(Copy from Specification No. 607, opposite.)

Felts Under Insulation—(Copy from Specification No. 607, opposite.)

Insulation—(Copy from Specification No. 607, opposite.)

Roofing—Lay four plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 24½" over the preceding one, mopping under each with the pitch to a width of 30" starting 2" from the exposed edge.

With nailing strips provided as required, nail each sheet at each nailing strip with two nails spaced 8" and 10" respectively from the back edge.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

(Copy from Specification No. 607, opposite, except change to Ten-Year.)

*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 711

FELTS: (Change name of felt to "J-M 15-lb. Bonded Tar-Saturated Rag Felt.")

SPECIFICATION No. 108

J-M 20-YEAR ROOF OVER INSULATION ON STEEL DECKS

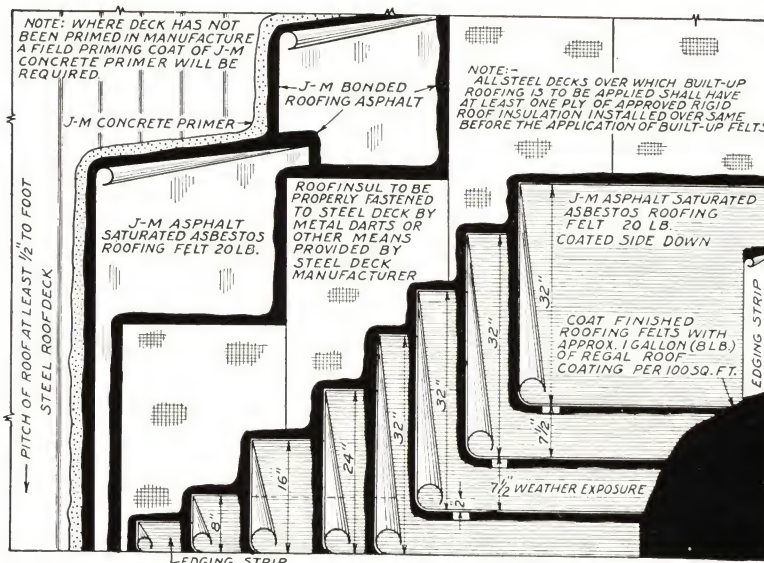
Surface: SMOOTH

Felts: ASBESTOS

Waterproofing: ASPHALT

Insulation: ROOFINSUL

Inclines: 1/2 in. to 9 inches per foot



BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt (An additional ply of 20-lb. asbestos felt is specified for application under the insulation, in Specification No. 502. See page 32.)	80 lb.
PRIMER (unless steel deck has been shop-coated): J-M Concrete Primer (8 lb. per gal.)	1 gal.
ASPHALT: J-M Bonded Roofing Asphalt (for mopping between felts)	120 lb.
For mopping felt to deck	30 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. 1/2" thick)	100 sq. ft.
For each layer of insulation	100 sq. ft.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(a) Roof construction, including cants, covers or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, the felts shall be laid parallel to the pitch.

The roof felts shall be turned up 2" on all vertical surfaces without being cemented thereto.

Insulation—(Copy from J-M Standard Specification No. 502, page 32.)

Roofing—Lay four plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 24 1/2" over the preceding one, mopping the full width under each with the asphalt or, if job conditions make it desirable to apply the roofing in two operations, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt. Over these felts, lay two additional plies, applied in the same manner as the first two.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

SPECIFICATION No. 109

J-M 15-YEAR ROOF OVER INSULATION ON STEEL DECKS

Surface: SMOOTH

Waterproofing: ASPHALT

Felts: ASBESTOS

Insulation: ROOFINSUL

Inclines: 1/2 in. to 9 ins. per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 3 layers of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt (An additional ply of 20-lb. asbestos felt is specified for application under the insulation, in Specification No. 502)	60 lb.
PRIMER (unless steel deck has been shop-coated): J-M Concrete Primer (8 lb. per gal.)	1 gal.
ASPHALT: J-M Bonded Roofing Asphalt (for mopping between felts)	90 lb.
For mopping felt to deck	30 lb.
For mopping insulation over felt	30 lb.
For mopping each additional ply of insulation	30 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft. 1/2" thick)	100 sq. ft.
For each layer of insulation	100 sq. ft.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

ROOF DECK

(Copy from Specification No. 108, above.)

INSTALLATION

General—(Copy from Specification No. 108, above.)

Insulation—(Copy from J-M Standard Specification No. 502, page 32.)

Roofing—Lay three plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 22" over the preceding one, mopping the full width under each with the asphalt.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

Protecting Insulated Roofs Against Humidity

For many years it has been generally recognized that wherever humid conditions may be encountered, it is essential that roof insulation be protected on the underside against the absorption of moisture. Specifications of architects and roofing manufacturers have, therefore, called for a membrane waterproofing course under the insulation wherever it was known at the time the roof was designed that the insulation would be subjected to such conditions.

But there are occasions, after a relatively few years, where there is a change in the use to which a building is put. From an operation not in the least humid, the condition may change almost overnight into one which exposes the insulation to severe moisture conditions.

All types of roof insulation will absorb moisture. The very

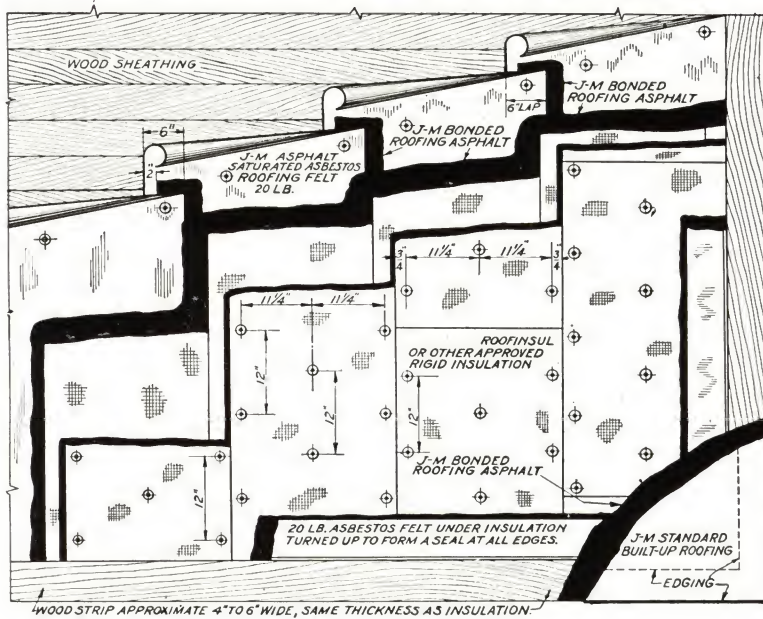
factor that makes the material effective as an insulation—porosity—is, of course, responsible for its absorption of moisture. When insulation on a roof becomes water-soaked, the results are:

- A serious reduction in insulating efficiency.
- Destruction of bond between insulation and roofing felts.
- Disintegration of the insulating material.
- Almost certain damage to the roof deck itself.
- Possible damage to the building contents.
- An expensive re-roofing and re-insulating job.

All Johns-Manville Roof Insulation Specifications call for the application of a layer of waterproofing roofing felt under the insulation.

JOHNS-MANVILLE ROOF INSULATION

SPECIFICATION No. 500



J-M ROOFINSUL ON WOOD DECKS TO BE OVERLAID WITH A J-M ASPHALT BUILT-UP ROOF

BILL OF MATERIALS PER 100 SQ. FT.

FELT (under insulation): 1 layer of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt.....	20 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft., 1/2\"	100 sq. ft.
ASPHALT: J-M Bonded Roofing Asphalt	
For mopping each layer of insulation	30 lb.

ROOF DECK

As J-M Roofinsul (rigid roof insulation) requires, and is designed to receive, built-up roofing directly over it, the following specification has been prepared to be appended to certain Standard Specifications for J-M Asphalt Built-Up Roofs. The specifications for such roofs, designed particularly for application over approved rigid insulation on wood decks are given on previous pages. The roof deck, before being considered satisfactory to receive the insulation, shall be in the condition outlined in the built-up roof specification.

INSULATION

(a) Lay one ply of the 20-lb. asbestos felt, lapping the sheets 6\", mopping in the laps with the asphalt and nailing sufficiently to hold in place. This felt shall be turned up on, but not cemented to, all vertical surfaces to a height 6\"

(b) Lay the Roofinsul with the rough side down and with all end joints broken, mopping the full width under each sheet with the asphalt. The edges of the sheets at the joints shall be thoroughly sealed with the asphalt.

(c) The insulation shall be isolated into areas approximately 30 ft. square by path-strippings of one ply of the 20-lb. asbestos felt,

mopped the full width with the asphalt, to extend not less than 4\"

NAILING

Each sheet of the insulation shall be nailed at 12\"

SEALING

The upturned felt at vertical surfaces and roof edges shall be turned down and mopped solidly to the insulation.

PROTECTION

Insulation shall not be left exposed to the weather. No more insulation shall be laid than can be completely covered with the roofing felts on the same day. At the end of the day's work, roofing felts shall be turned down over the exposed edges of the insulation and mopped solidly.

SPECIFICATION No. 501

J-M ROOFINSUL ON NON-COMBUSTIBLE DECKS TO BE OVERLAID WITH A J-M ASPHALT BUILT-UP ROOF

BILL OF MATERIALS PER 100 SQ. FT.

FELT: 1 layer of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	20 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft., 1/2" thick) For each layer of insulation	100 sq. ft.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1 1/2 to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	
For mopping each layer of insulation	30 lb.

ROOF DECK

(Copy from Specification No. 500, on previous page.)

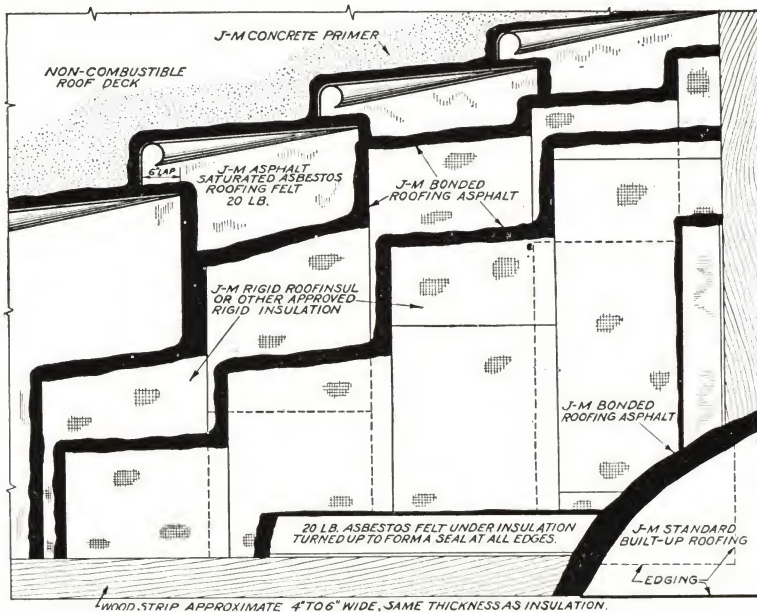
INSULATION

(a) Coat all surfaces which are to receive the insulation with the asphalt primer and allow to dry.

(b) Lay one ply of the 20-lb. asbestos felt, lapping the sheets 6", mopping the full width under each with the asphalt. This felt shall be turned up on . . . (Balance, same as paragraph (a) of Specification No. 500, on previous page.)

(c) (Copy paragraph (b) of Specification No. 500.)

(d) (Copy paragraph (c) of Specification No. 500.)



NAILING

If roof construction permits, nail each sheet at 12" centers adjacent to the longitudinal edges and staggered through the longitudinal center. With nailing strips provided as required, each sheet shall be nailed at each strip at 12" centers.

SEALING

(Copy from Specification No. 500, on previous page.)

PROTECTION

(Copy from Specification No. 500, on previous page.)

SPECIFICATION No. 502

J-M ROOFINSUL ON STEEL DECKS TO BE OVERLAID WITH A J-M ASPHALT BUILT-UP ROOF

Minimum Pitch: 1/2 inch per foot

BILL OF MATERIALS PER 100 SQ. FT.

FELT (under insulation): 1 layer of J-M 20-lb. Asphalt-Saturated Asbestos Roofing Felt	20 lb.
INSULATION: J-M Roofinsul (0.8 lb. per sq. ft., 1/2" thick) For each layer of insulation	100 sq. ft.
PRIMER (unless steel deck has been shop-coated):	
J-M Concrete Primer (8 lb. per gal.)	1 gal.
ASPHALT: J-M Bonded Roofing Asphalt	
For mopping each layer of insulation	30 lb.

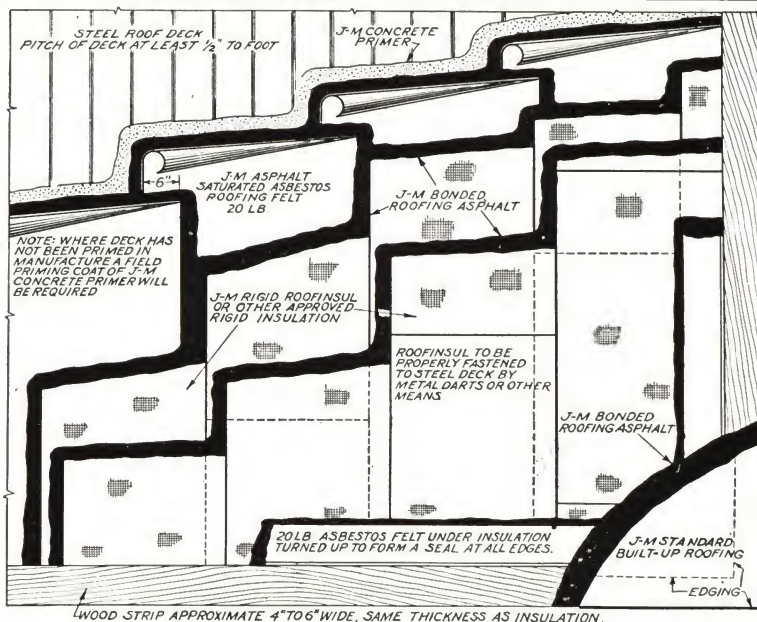
ROOF DECK

(Copy from Specification No. 500, on previous page.)

INSULATION

(a) If the steel deck has not been shop-coated with asphalt paint, or if such coating is incomplete or has been damaged, the entire deck or such uncoated areas shall be painted with the primer and allowed to dry.

(b) (Copy paragraph (b) of Specification No. 501, above.)



(c) (Copy paragraph (b) of Specification No. 500.)

(d) (Copy paragraph (c) of Specification No. 500.)

SECURING OF INSULATION

If the pitch of the roof deck is 3" per foot or greater, the insulation shall be secured by means of steel darts or other approved device. (Follow with the second sentence under "Nailing" in Specification 500, changing word "nailing" to "fastening.")

SEALING AND PROTECTION

(Copy from Specification No. 500, on previous page.)

J-M ASBESTILE FLASHING SYSTEM (10-YEAR BOND)

Johns-Manville Flashing is constructed of the same basic materials as Johns-Manville Built-Up Roofs— asbestos felts, asphalt and Asbestile, a plastic asbestos-asphalt composition, being the main component parts. It may be installed to cover completely the top and inside face of parapet walls, to extend through walls, or to extend not less than 8" high on the inside face only. J-M Flashing may also be used with a sheet metal cap flashing built into the walls, or it may be used in conjunction with raggle blocks. As Johns-Manville Flashing is used only in connection with Johns-Manville Built-Up Roofing, the following specification has been prepared to be appended to the Standard Specifications for such Built-Up Roofs:

The height of flashing on parapet walls shall be *state whether ("not less than 8") or ("so as to cover completely entire inside face of wall and top of wall under coping to within 2" of outside face") or ("not less than 8" with cap flashing built into and extended through wall to form a dampproof course.")* If flashing is to be carried into raggle block, so state.

The height of flashing on high walls shall be *(state whether "same height as on adjoining parapet walls") or ("Not less than 8", with cap flashing built into and extended through wall to form a dampproof course.")*

All masonry surfaces which are to receive the base or cap flashing shall be coated with J-M Concrete Primer and allowed to dry.

BASE FLASHING

(See drawings on next page.)

Lay one thickness of the 15-lb., or 20-lb. roofing felt to extend not less than 6" high on the vertical surface to be flashed, and not less than 4" on the roof, lapping the sheets 3", mopping the full width under each with the asphalt, or, if applied with roofs employing pitch, either such pitch or asphalt may be used.

A base flashing composed of J-M Asbestos Base Flashing Material shall be applied directly over and entirely covering the 15-lb. or 20-lb. roofing felt, cemented to it with the asphalt or pitch.

The base flashing shall be nailed, adjacent to its upper and end edges, with large head nails spaced at 8" centers driven into the brick joints or the nailing strip.

The edge of the base flashing on the roof shall be covered with a 4" wide strip of 15-lb. Asbestos Felt, embedded in and coated over with asphalt or, if applied in connection with roofs employing pitch, such pitch shall be used.

The end joints shall be covered with Asbestile, as specified under "Cap Flashing." *(See page 35.)*

On skylight curbs, etc., the flashing shall extend the full height, and turn over on top the full width, of the curb.

If no nailing facilities have been provided for securing the upper edge of the base flashing, a five-course cap and base flashing will be acceptable, constructed of alternating layers of Asbestile and 15-lb. Asbestos Felt. Such flashing shall be applied in a manner similar to that specified later for the application of cap flashing to full height of wall, repeating the operations described to provide three layers of Asbestile and two layers of felt. Such flashing shall extend on the vertical surfaces and on the roof the same distance as specified for the flashing method it displaces.

BASE FLASHING WITH RAGGLE BLOCK

(See drawing on page 35.)

The groove in the raggle block shall be coated with J-M Concrete Primer and allowed to dry.

One thickness of the 15-lb. or 20-lb. roofing felt shall be applied to extend not less than 4" on the roof, to cover the cant entirely, and to extend to the full depth of the groove in the raggle block. This felt shall be embedded in asphalt, (or, if applied with roofs employing pitch, either such pitch or asphalt may be used) on the roof and cant, and in a layer of Asbestile, approximately 1/8" thick, in the groove in the raggle block.

One thickness of J-M Asbestos Base Flashing Material shall be applied directly over and entirely covering the 15-lb. or 20-lb. felt and similarly cemented to it with the asphalt or pitch and the Asbestile. The base flashing shall be nailed adjacent to the groove, into the joints between raggle blocks. At all joints of the base flashing material, and at 12" centers between, wood wedges, primed and coated with Asbestile, shall be driven into the groove to prevent slippage of the flashing. Any remaining voids in the grooves shall be caulked with Asbestile and oakum. A layer of Asbestile, approximately 1/8" thick, shall be troweled in place to extend not less than 3" on the cant and 2" on the face of the raggle block to cover entirely the groove in the raggle block.

A strip of the 15-lb. or 20-lb. felt not less than 4" wide shall be embedded therein and a second layer of Asbestile, of the same thickness as the first, troweled over and finished to a feather edge and to a straight line at the upper and lower edges.

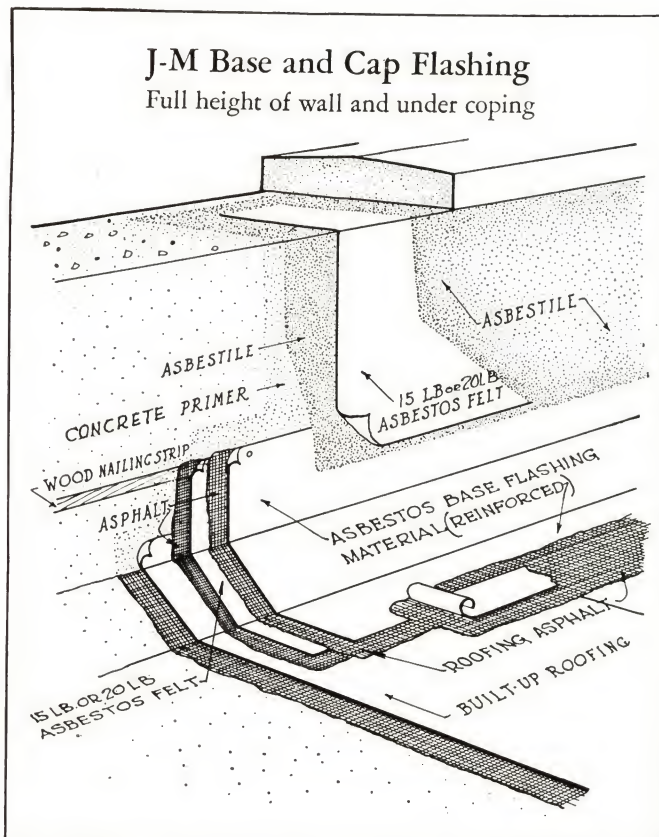
The edge of the base flashing on the roof shall be covered with a 4" wide strip of the 15-lb. felt embedded in and coated over with asphalt or pitch.

The end joints of the base flashing shall be covered with Asbestile as specified under "Cap Flashing." *(See page 35.)*

Details Showing Various Methods of Flashing Johns-Manville Bonded Built-up Roofs

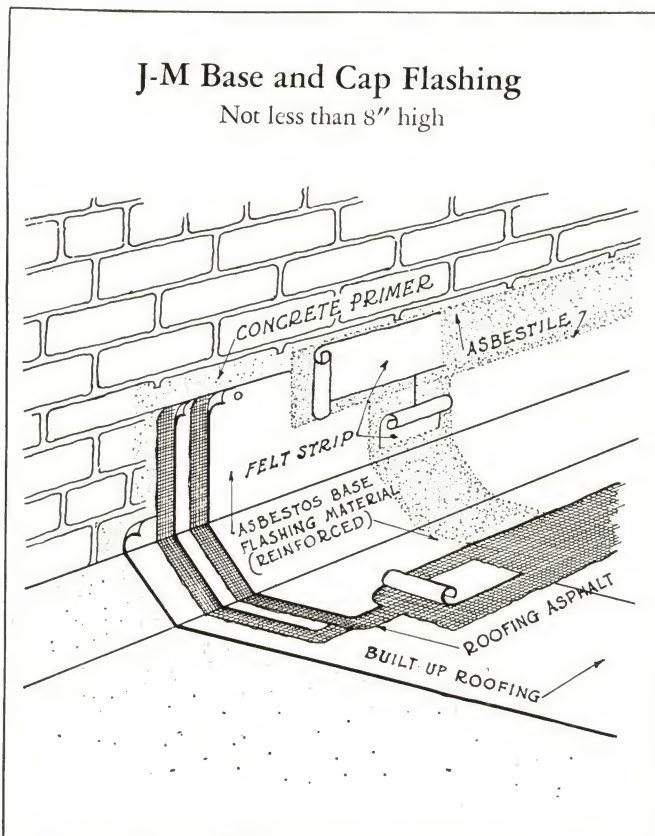
J-M Base and Cap Flashing

Full height of wall and under coping



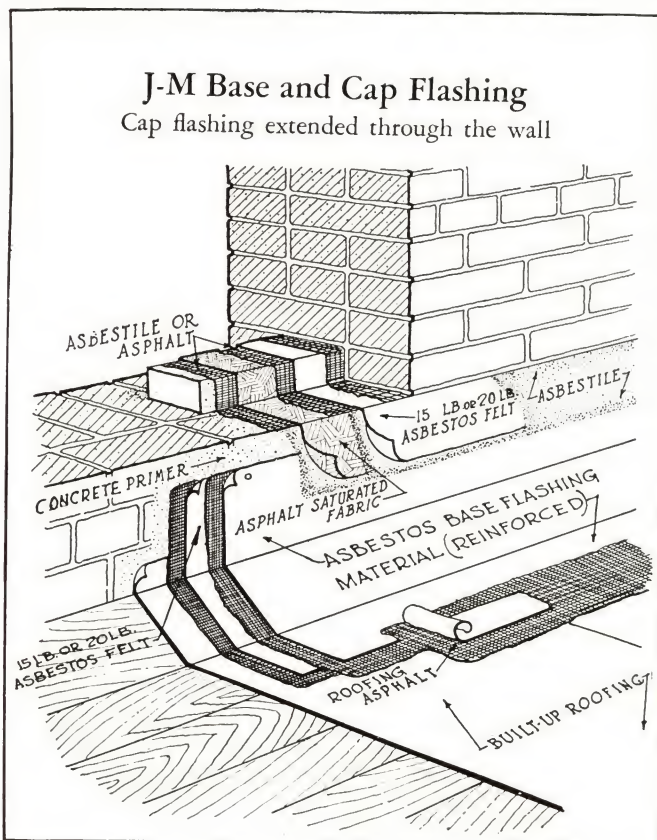
J-M Base and Cap Flashing

Not less than 8" high



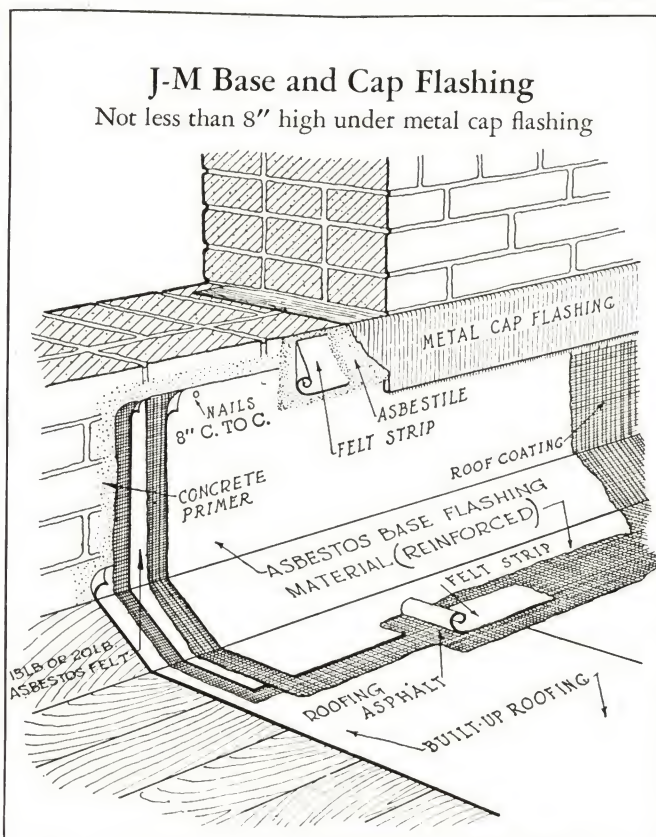
J-M Base and Cap Flashing

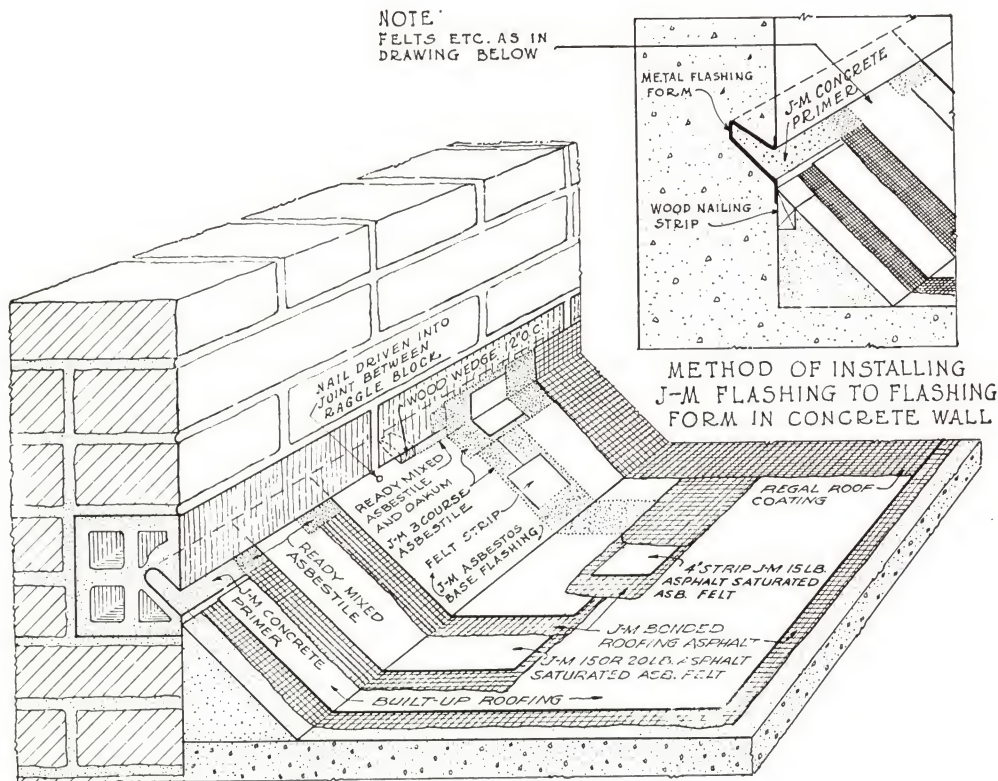
Cap flashing extended through the wall



J-M Base and Cap Flashing

Not less than 8" high under metal cap flashing



BASE FLASHING WITH RAGGLE BLOCK (See page 33)**CAP FLASHINGS (See drawings on opposite page)****When J-M Flashing is specified to be not less than 8 ins. high or when sheet metal cap flashing is to be used with J-M Flashing**

A layer of Asbestile, approximately $\frac{1}{8}$ " thick and not less than 5" wide, shall be troweled in place to cover the nail heads, the upper edge of the base flashing and the adjoining surface of the wall. A strip of 15-lb. Asphalt-saturated Asbestos Felt not less than 4" wide shall be embedded therein and a second layer of Asbestile, of the same thickness as the first, troweled over and finished to a feather edge and to a straight line at the upper and lower edges. If a sheet metal cap flashing is specified, the Asbestile cap flashing shall extend to the point where such metal flashing protrudes from the wall.

End laps in base flashing shall be similarly covered.

When J-M Flashing is specified to extend full height of wall under coping to within 2 ins. of outside face.

A layer of Asbestile, approximately $\frac{1}{8}$ " thick, shall be troweled in place to cover the nail heads and the upper edge of the base flashing not less than 4" and the entire inside face and top of the wall (under the coping) to within 2" of the outside face. One thickness of 15-lb. Asphalt-saturated Asbestos Felt shall be embedded therein, with the sheets lapped 3" and sealed with Asbestile, and a second layer of Asbestile, of the same thickness as the first, troweled over and finished to a feather edge and to a straight line at the lower edge.

When J-M Flashing is specified to be not less than 8 ins. high with cap flashing extended through wall

One ply of J-M Type B Asphalt-saturated Fabric shall be applied to the temporary top of the wall, to extend from within 2" of the outside face to the inside face and project so as to cover the base flashing not less than 4". This fabric shall be cemented to the top of the wall with the asphalt or Asbestile. One ply of 15-lb. Asphalt-saturated Asbestos Felt shall be applied directly over and entirely covering the fabric, cemented to it, and coated over, with the asphalt or Asbestile. The projecting felts shall be temporarily covered for protection during the completion of the wall. After the wall has been completed and the roofing and base flashing installed, the temporary protection shall be removed and a layer of Asbestile, approximately $\frac{1}{8}$ " thick, shall be troweled in place to cover the nail heads and the upper edge of the base flashing and the inside face of the wall to the underside of the projecting fabric and felt. The projecting fabric shall be embedded therein, over which shall be troweled a second layer of Asbestile, of the same thickness as the first, in which shall be embedded the projecting felt, over which shall be troweled a final layer of Asbestile of the same thickness as the preceding layers, finished to a feather edge and to a straight line at the lower edge and to the line of the projecting fabric and felt at the upper edge.

Johns-Manville



**BONDED
BUILT-UP
ROOFS**

